

USER MANUAL

_VOCODER V

ARTURIA

_The sound explorers

DIRECTION

Frédéric Brun

Kevin Molcard

DEVELOPMENT

Simon Conan

Timothée Behety

Yann Burrer

Cyril Lepinette

Geoffrey Gormond

Raynald Dantigny

Markus Bollinger

Antoine Moreau

Corentin Comte

Alexandre Adam

Loris De Marco

Mathieu Nocenti

Samuel Limier

Baptiste Aubry

Pierre-Lin Laneyrie

Marie Pauli

DESIGN

Baptiste Le Goff

Florian Rameau

Shaun Ellwood

Morgan Perrier

SOUND DESIGN

Jean-Baptiste Arthus (lead)

Menno Hoomans

Thibault Morel

Simon Galiffet

Bastiaan Barth

Maxime Dangles

Ed Ten Eyck

Tom Hall

BETA TEST TEAM

David Birdwell

Jay Janssen

Marco Correia 'KoshDukai'

Mat Herbert

Gustavo Bravetti

Craig Anderton

Tony Flying Squirrel

Max Ace

Chuck Zwicky

George Ware

Richard Courtel

Peter Tomlinson

Jeffrey M Cecil

Chuck Copsis

Fernando Manuel

Terry Marsden

Guillaume Hernandez-

Rodrigues

Paul Beaudoin

Pagnier

Timothy Trifeletti

TEST TEAM

Germain MARZIN

Benjamin RENARD

MANUAL

Craig ANDERTON (author)

Minoru KOIKE

Charlotte METAIS

Jose RENDON

Camille DALEMANS

Vincent LE HEN

Florence BURY

Holger STEINBRINK

Roger LYONS

Jimmy MICHON

Gala KHALIFE

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26 avenue Jean Kuntzmann
38330 Montbonnot-Saint-Martin
FRANCE
www.arturia.com

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Thank you for purchasing Vocoder V!

This manual covers the features and operation of Arturia's **Vocoder V**, whose design goal was to be the most powerful and versatile virtual vocoder available today.

Be sure to register your software as soon as possible! When you purchased Vocoder V you were sent a serial number and an unlock code by e-mail. These are required during the online registration process.

Special Messages

Specifications Subject to Change:

The information contained in this manual is believed to be correct at the time of printing. However, Arturia reserves the right to change or modify any of the specifications without notice or obligation to update the hardware that has been purchased.

IMPORTANT:

The software, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable.

If you encounter any hearing loss or ringing in the ears, you should consult an audiologist.

Introduction

Congratulations on your purchase of Arturia's Vocoder V!

We'd like to thank you for purchasing Vocoder V. It expands on the vocoder tradition by bringing it into the virtual world, but Vocoder V also provides capabilities, flexibility, and sounds no hardware vocoder can approach.

Arturia has a passion for excellence, and Vocoder V is no exception. With Vocoder V, vocoders are no longer only about "talking instruments." Feed in drums instead of voice, sing into the built-in synthesizer, shift timbres, sequence samples through the vocoder, play it like a conventional keyboard instrument, and even trigger the synthesizer with guitar solos - you have never experienced a vocoder like this! We are confident that Vocoder V will provide you with creative possibilities that will excite, inspire, and delight you.

Be sure to visit the www.arturia.com website for information about all of our other great hardware and software instruments. They have become indispensable, inspiring tools for musicians around the world.

Musically yours,

The Arturia team

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1. WELCOME TO VOCODER V

1.1. Iconic Sound, Modern Features

A vocoder analyzes the human voice and imparts those vocal qualities to synthesized sounds. Although known mostly for making “talking instrument” and robot voice effects, the vocoder (from “voice encoder”) had its origins almost a century ago at Bell Labs. The goal was to improve the efficiency of telecommunications by reducing the bandwidth needed to communicate speech. Later, during World War II, some of these same principles were applied to a classified communications system.

The vocoder wasn’t used much in music until 1968, when Robert Moog developed a solid-state vocoder. Since then, several companies have introduced hardware vocoders. Vocoder V draws its inspiration from a variety of vocoders, including those considered “gold standards” for classic vocoder effects.

The vocoder’s popularity started soaring in the 70s, and the effect has been used by artists as diverse as Kraftwerk, Jean Michel Jarre, Neil Young, Phil Collins, Herbie Hancock, Daft Punk, Michael Jackson, Coldplay, Red Hot Chili Peppers, and others. Vocoders have also found a home in movies, games, and radio. Famous songs using vocoders include:

[Kraftwerk - The Robots](#)

[Giorgio Moroder - E=MC²](#)

[Daft Punk - Robot Rock](#)

[Herbie Hancock - I Thought It Was You](#)

[Beastie Boys - Intergalactic](#)

[Grandmaster Flash & The Furious Five - Scorpio](#)

Vocoders are typically either stand-alone devices used with an external synthesizer, or built into keyboards. Software-based vocoders no longer need to incorporate expensive hardware, so not only have they made vocoding more affordable, they can also add features that would be difficult or impossible to implement with hardware.

When Arturia started designing Vocoder V, the object was not simply to produce “another vocoder,” but to add a level of innovation, flexibility, and sound quality that took advantage of Arturia’s decades of experience with synthesis, modulation, and effects.

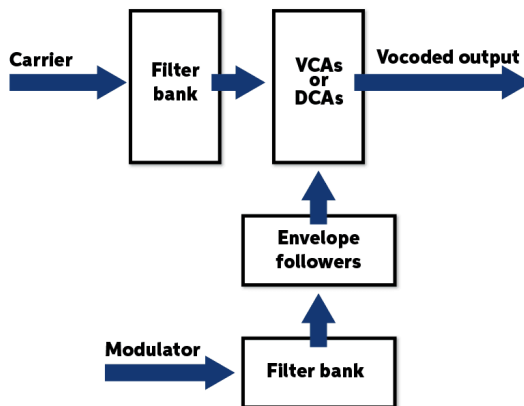
1.2. How Vocoders Work

Traditional vocoders have two inputs and one output. Both inputs need to receive audio, or there is no effect. The two inputs are:

Modulator The usual input is speech from a microphone, although drums have also become a popular modulation source. However, Vocoder V also includes a sampler player for playing back up to 12 different samples. These can include sound sources like drum loops, sound effects, percussion, rhythm guitar, and more; you are not limited to vocal sounds.

Carrier The modulator modifies the carrier's sound. Usually this is a sustained sound, like a synthesizer pad, choir, string section, and the like. Vocoder V features a full-featured synthesizer for the carrier. The vocoder impresses the modulator's speech characteristics onto the carrier, which is how the modulator makes the carrier "talk."

With analog vocoders, the main elements are filter banks, VCAs, and envelope followers. Vocoder V recreates these elements digitally, but the principle of operation is the same



A vocoder contains two identical filter banks that cover specific bands throughout the audio spectrum, somewhat like a graphic equalizer. Vocoder V's filter bank uses 16 filters to create 16 frequency bands.

The carrier goes through one filter bank, where each filter output feeds a DCA (digitally controlled amplifier, the digital equivalent of an analog synthesizer's VCA). Each DCA therefore controls a carrier band's level.

The modulator goes through an identical filter bank, but each filter feeds an envelope follower that controls the corresponding carrier filter's level. For example, speech produces energy at different frequencies, so the modulator envelope followers control the carrier filter VCAs that correspond to speech frequencies. Or, if a kick drum is the modulator, then only the carrier's low-frequency filters will be triggered to let audio through.

Another vocoding element is adding noise selectively, which improves intelligibility with vocal effects. The noise can reproduce fricatives (consonants that result from friction in the mouth, like "s" or "f"). Vocoder V includes a way to adjust the amount of noise injected in response to fricatives, which makes vocal effects much clearer.

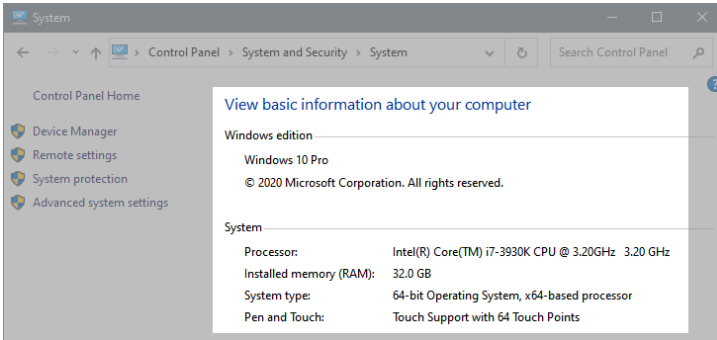
Remember that vocoders are not only useful with voice—you can obtain exciting, rhythmic effects by using a modulation source like drums with any sustained carrier source, such as guitar power chords. The chords become more interestingly rhythmically, and sync with the drums. Ultimately, Vocoder V can do everything traditional vocoders do—but also offers many new capabilities.

2. ACTIVATION FIRST START

2.1. System Requirements

Vocoder V works with computers that meet these minimum specifications.

- Operating System: Windows 8.1 or later (64-bit), macOS 10.13 or later
- 4 GB RAM
- 2.5 GHz CPU
- 2 GB free hard disk space
- OpenGL 2.0 compatible GPU



To find a Windows computer's specs, right-click on This PC and choose Properties, or open the Control Panel then choose System and Security > System.



To find a macOS computer's specs, choose About this Mac from the Apple menu.

Please note that these are the minimum specifications. Most DAWs require at least 8 GB of RAM for stable operation with typical projects..

2.1.1. Stand-Alone and Plug-In Modes

Stand-alone mode is available with both Windows and MacOS. Only one Vocoder V instance can be open at a time in stand-alone mode.

As a plug-in, Vocoder V is compatible within most 64-bit DAWs as an Audio Unit, AAX, VST 2.4, or VST3 instrument. With DAWs that cannot route audio to virtual instrument plug-ins, Vocoder V's Sampler Player is available, but not its real-time live input feature (see section 2.3.2.1 for supported DAWs).

2.2. Activate the Vocoder V License

After installing Vocoder V, please activate your software license using the Arturia Software Center program. If it's already installed, skip to section 2.2.2.

2.2.1. Installing the Arturia Software Center (ASC)

Go to the web page Arturia Downloads and Manuals at <https://www.arturia.com/support/downloads&manuals>

After locating the Arturia Software Center at the top of the downloads list, download the installer that's compatible with your operating system (Windows or macOS), and then follow the installation instructions.

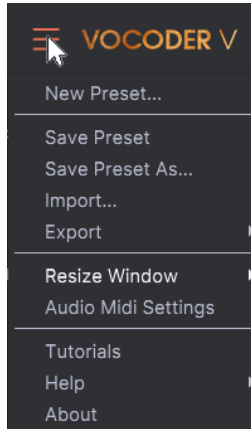
2.2.2. Activating Vocoder V

Launch the Arturia Software Center (ASC), and log into your Arturia account. Scroll down to the My Products section, and then click the Vocoder V Activate button.

Now you're ready to add fantastic vocoder effects—and more!—to your music.

2.3. Initial Setup

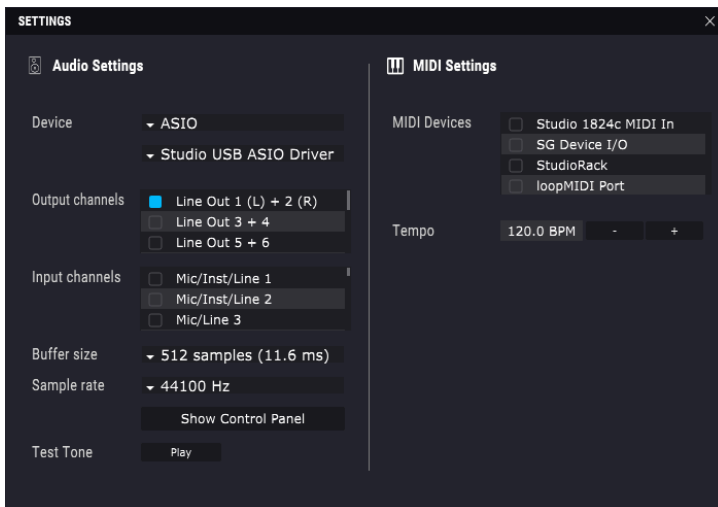
To access the settings for file management, interface resizing, audio and MIDI settings for stand-alone operation, and help, click on the three lines in the upper left corner.



2.3.1. Stand-Alone Settings

In stand-alone mode, you need to specify how Vocoder V interacts with your computer's audio and MIDI input and outputs. The audio input sends an audio signal to serve as the vocoder's modulator, while the output receives Vocoder V's audio output. MIDI triggers notes in Vocoder V's internal synthesizer.

Choose Audio Midi Settings from the menu shown above to make the appropriate audio and MIDI assignments.



2.3.1.1. Stand-Alone Audio Settings

Device Choose your computer's audio driver protocol in the top Device drop-down menu. The Mac uses Core Audio. Windows uses ASIO, DirectSound, or Windows Audio. ASIO provides the best performance with Windows, but requires an external ASIO-compatible audio interface.

In the lower Device drop-down menu, choose your audio interface, such as the Arturia AudioFuse Studio or AudioFuse USB interface.

For the remaining options, Mac and Windows work similarly.

Output Channels To hear Vocoder V's audio output, select an output channel from your audio interface that connects to a monitoring system. The number of outputs you'll see depends on your interface; this field may show your interface's name. Note that some audio interfaces use proprietary mixer applications that must be set correctly to hear outputs and receive inputs. Please refer to your interface's documentation for information on its mixer application (if any).

Input Channels Select an input channel from your audio interface, such as a microphone input, to provide an audio signal to Vocoder V's modulator.

i If you are using two different interfaces in stand-alone mode, like a laptop's microphone for the input and a USB interface for the output, you will need to aggregate the two interfaces so that they look like a single interface to the computer. For Windows, use Windows native drivers (Windows Audio or DirectSound) as the Device in Audio Midi settings, and all available inputs and outputs will show in the Audio Midi settings. For the Mac, open Audio MIDI Setup (under Utilities), and then choose the Audio Devices window. Click the little + sign in the lower left corner; an Aggregate Device box appears, and you'll see a list of available I/O. Check the interfaces you want to aggregate, and check "resample" for the secondary interface or interfaces. Now all input and output options will be available to Vocoder V. For more information, see the in-app tutorials.

Buffer Size and Sample Rate Vocoder V will read these parameter values from your audio interface. With some interfaces, changing these values in Vocoder V will change the parameters values in the interface, and vice-versa. With other interfaces, Vocoder V will change the parameter values, but you will need to close and re-open the interface's control panel to see these changes. To see the audio interface's control panel, click on Show Control Panel.

The Buffer Size trades off CPU load with the delay between playing a note on your keyboard and hearing it. This delay is called latency, as listed in ms to the right of the buffer size. Lower buffer sizes give less latency, but too low a buffer can produce pops, clicks, or audio distortion. A buffer setting of 256 or 128 samples should work properly with any modern computer running a project of average complexity. Projects with multiple virtual instruments, CPU-hungry reverbs, and lots of plug-ins may require increasing the buffer size. However, remember that sound travels at about 1/3 meter (1 foot) per millisecond. So, a 3 ms delay is only about the same amount of delay as sitting a meter away from your monitor speakers.

Sample Rate is traditionally 44.1 kHz for CD quality, 48 kHz for use with video, and 96 kHz for "high-resolution" audio. 96 kHz operation requires more CPU power, and is rarely necessary with most music production.

Test Tone Click Play to send a test tone and verify that the output is going to your monitoring system.

2.3.1.2. MIDI Settings

MIDI Devices Choose the MIDI input from your computer's MIDI interface. Unlike audio, you can choose several MIDI inputs (for example, a keyboard and a separate control surface). In stand-alone mode, Vocoder V defaults to MIDI messages coming in on any channel number, so there's no need to set a particular channel. However, you can choose a specific channel, as described in chapter 10 on MIDI control.

Tempo Vocoder V can synchronize various parameters to tempo. In stand-alone mode, choose a tempo that corresponds to the song tempo. When used as a plug-in, the tempo follows the host tempo automatically.

2.4. Using Vocoder V as a Plug-In

Whether your DAW supports VST, AU, or AAX, different DAWs have different ways of handling a plug-in like Vocoder V, because it has characteristics of both a virtual instrument and a signal processor. Fortunately, Vocoder V knows if you're using a supported DAW. In Vocoder V's Voice Input section, click the Help button for instructions on how to insert Vocoder V in your specific DAW. You can also review the ways of inserting Vocoder V for different DAWs in the Tutorial, "Learning the Instrument." Access tutorials by clicking on the Gear icon in the interface's upper right.

2.4.1. Supported DAWs

Vocoder V officially supports the following DAWs.

- Ableton Live 9/10/11
- Bitwig 3
- Steinberg Cubase 9/10/11
- Apple Logic Pro X
- Native Instruments Maschine 2
- Avid Pro Tools 2019-2020
- Cockos Reaper
- Reason Studios Reason
- Cakewalk by BandLab

The following DAWs do not allow audio routing into external instruments. Therefore, you cannot feed audio into Vocoder V or use the Voice Input section. However, you can trigger samples for playback with the Sample Player.

- PreSonus Studio One 5
- FL Studio

2.4.2. Plug-In Behavior

When used as a plug-in with a host DAW, Vocoder V's interface and settings work the same way as stand-alone mode, with the following differences.

- Audio and MIDI interface settings aren't needed. Vocoder V adopts whatever settings the host uses.
- Tempo synchronizes to the host tempo instead of the tempo in Settings.
- Vocoder V responds to parameter automation from your DAW as well as external MIDI control.
- Unlike stand-alone mode, multiple Vocoder V instances can be open in a host.
- Because Vocoder V is an instrument plug-in, you can add audio effect plug-ins after it to further process the sound.

3. OVERVIEW

Vocoder V's design generally follows a vocoder's workflow. Typically, you'll choose a signal source with the Voice or Sample Player to modulate the sound of a Synthesizer (such as giving the synthesizer vocal qualities that sound like it's talking), and then manipulate the vocoder controls to further refine the sound. In traditional vocoders, the Voice section is called the modulator, and the Synthesizer is called the carrier. Vocoder V's sections correspond to this workflow, with separate sections for the Voice/Sample Player section, the Vocoder section itself, and the carrier Synthesizer.

A separate flyout to the right offers system and MIDI settings, as well as tutorials.

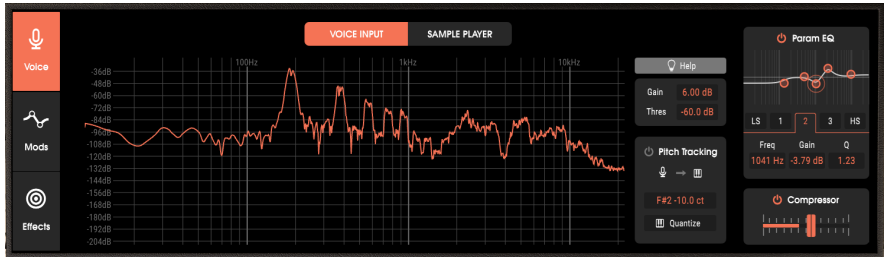


The toolbar at the top of the interface provides (from left to right) a menu for file management, setup, and help, as accessed by clicking on the three lines at the upper left. The middle section accesses the Library and preset Browser. Additional buttons to the right choose between the Voice or Sample Player input; the Advanced button shows or hides the Advanced panel, and the Gear icon opens the flyout.

3.1. The Advanced Panel

Although it's easy to use Vocoder V by just calling up presets, there are many ways to customize its operation to create your own signature sound. The Advanced Panel has three sections: Voice, Modulations, and Effects. Voice has two sub-sections.

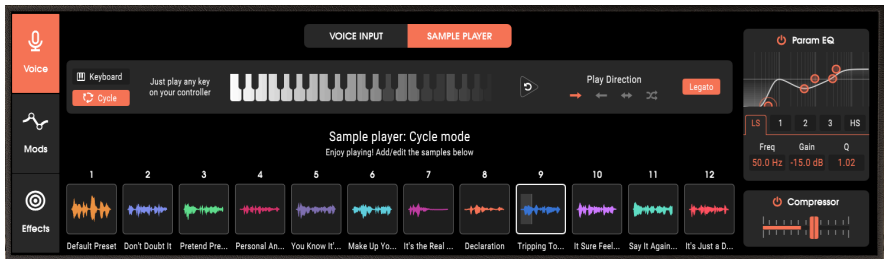
3.1.1. Voice Input



This accepts and adjusts the voice input, which is the most common modulator source for vocoders. However, it can accept other audio as well, such as drums. There's also a pitch tracking feature, which detects the pitch of monophonic signal sources (like voice) and triggers corresponding notes in the synthesizer. This allows you to "sing" a synthesizer part. Pitch tracking can work with other monophonic audio sources, like single-note guitar lines (good for creating guitar synthesizer effects), flute, and the like.

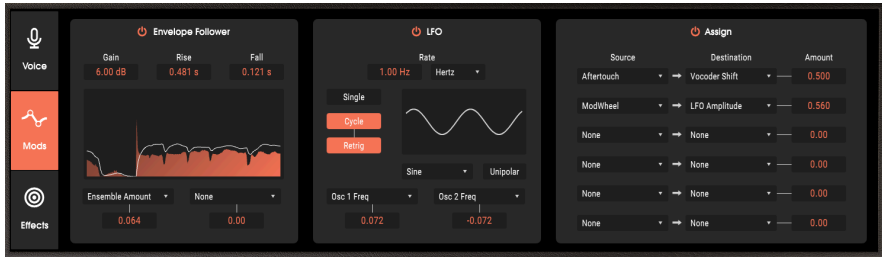
A parametric EQ and compressor, located at the output of this section, processes the input prior to passing it along to the main vocoder section.

3.1.2. Sample Player



The Sample Player offers several useful features. Instead of needing to always rely on real-time audio input, you can store 12 important phrases, drum fills, and even complete vocal parts, then use these to provide an audio input to the vocoder section. (The samples can be stereo, but they will be summed to mono prior to being vocoded.) Use a keyboard or other source of MIDI control signals to trigger samples, or step through them sequentially with newly played notes. Samples can also be time-stretched to fit particular rhythmic values, and looped. Note that the Sample Player and Voice Input can't be used simultaneously.

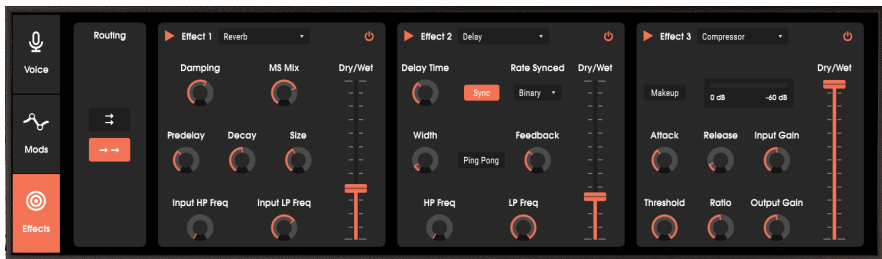
3.1.3. Mods



The Mods section provides control signals that you can route to several destinations in the vocoder and synthesizer sections.

An envelope follower derives a modulation signal from the input. LFO modulation, with several waveforms and tempo sync, is also available. Finally, a general-purpose Assign section can route other modulation sources, like velocity, pressure, mod wheel, and more, to various modulation destinations. All of these signals can be scaled, positively or negatively, to ensure the desired amount of modulation.

3.1.4. Effects



The effects are post-vocoder. Because they're accessed in the Advanced Panel, you can see them and edit them while also being able to see and edit the vocoder and synthesizer sections.

The 11 effects have a level of quality that's equal to or better than what's in most DAWs, so a single Vocoder V patch will likely contain all the processing you'll need. Three effects can be active simultaneously, with a series or parallel connection.

3.2. Carrier Synthesizer



The Voice Input or Sampler Player interacts with Vocoder V's Carrier Synthesizer to create the vocoder effect. This two-oscillator synthesizer includes four waveforms, FM synthesis, an ensemble effect, hard sync, and glide (monophonic and polyphonic). To simplify vocoding, a Chord feature allows playing any of several chords, or a custom chord, from a single note. Additionally, a hold option can hold a chord or single note indefinitely, while you modulate it from the input signal.

In addition to playing synthesizer notes suitable for modulation, the keyboard also reserves the lowest octave for calling up the Sample Player's 12 samples (when the Sample Player is active, and in Keyboard mode).

3.3. Vocoder



In this section, the modulation source, either the Voice input or Sampler Player, join with the carrier synthesizer to create the vocoding effect. 16 bands are sufficient to create intelligible vocals, but that's not all. Each band has its own level control for tailoring the vocoded sound's frequency response, and a patch bay lets modulator frequency bands control different carrier frequency bands—for example, a low-frequency input sound could trigger a high-frequency synthesizer band. Attack and Release controls provide amplitude envelope control over the vocoder's bands, while the Shift and Width controls alter the timbre in unique ways.

The Vocoder can also mix in hiss and buzz to increase intelligibility with vocal effects. Additional controls adjust overall level, the balance of dry and vocoded sounds, filter frequency shift, and sample-and-hold functionality to "freeze" particular sounds.

For diagnostic purposes, you can solo the individual Voice and Synth sounds feeding the vocoder section by clicking the headphone buttons. Note that these settings are not saved with presets, or the vocoder's current state.



♫ Soloing the synthesizer lets you play it like a standard synthesizer, without vocoding effects.

4. THE USER INTERFACE

In this chapter we'll start with an overview of the Vocoder V user interface. This will give you an idea of how the instrument is organized and where to find things. The point here is to establish how the interface is composed at a high level.

4.1. High-Level Overview

The Vocoder V is neatly subdivided into three sections.

1. **The Upper Toolbar:** This is where you handle administrative tasks such as saving, loading and browsing presets, editing various setup and configuration parameters, adjusting MIDI mappings and accessing advanced features.
2. **The Main Panel:** Here is where you will likely spend most of your time when working with Vocoder V. It contains a detailed reproduction of the Vocoder V panel and features.
3. **The Lower Toolbar:** This section provides quick access to a number of important parameters and useful bits of information such as CPU usage, panic button and undo history.

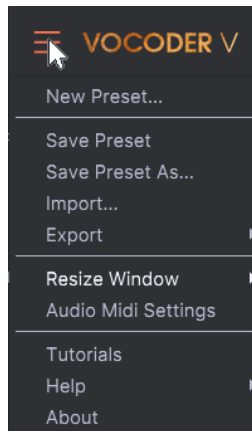
4.2. The Upper Toolbar



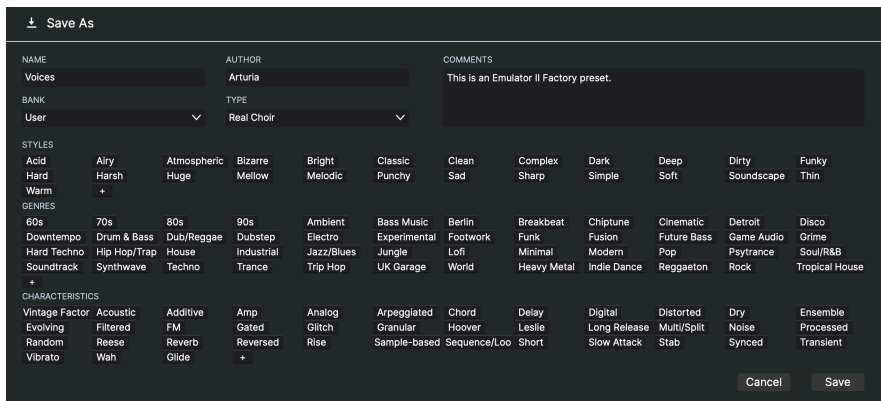
The toolbar that runs along the top of the instrument provides access to many useful features including the Vocoder V menu, preset browsing features, access to the "advanced" Screen mode and lastly the gear button which opens the side panel giving access to various MIDI functions including global MIDI channel and mapping features.

4.2.1. The menu

Clicking the Vocoder V box at the top-left corner opens a drop-down menu and lets you access ten important features.



- **New Preset:** This option creates a new preset with default settings on all parameters. It is a good place to start if you would like to create a new sound from scratch.
- **Save Preset:** This option will overwrite the currently loaded preset with any changes you have made. If you would like to save the current preset under a different name, use the "Save As..." option below.
- **Save Preset As...** This lets you save your preset under a different name. Clicking this option reveals a window where you can name your preset and enter information about it.



i 🎵: Arturia's powerful browsing system lets you save much more than just a preset name. For example, you can enter the Author's name, select a Bank and Type, select tags that describe the sound, and even create your own Bank, Type, and Characteristics. This information can be read by the preset browser and is useful for searching the presets banks later. You can even enter freeform text comments in the Comments field, which is handy for providing a more detailed description of a sound. This can help you remember a sound or to provide context to other users with which you are collaborating.

- **Import:** This command lets you import a preset file, which can be either a single preset or an entire bank of presets.
- **Export Menu:** You can export presets in two ways: as a single preset or as a bank.
 - **Export Preset:** Exporting a single preset is handy when you want to share a preset with someone else. The default path to these files will appear in the "save" window, but you can create a folder at another location if you like. The saved preset can be reloaded using the *Import Preset* menu option.
 - **Export Bank:** This option can be used to export an entire bank of sounds from the instrument, which is useful for backing up or sharing presets. Saved banks can be reloaded using the *Import Preset* menu option.
- **Resize Window:** The window can be resized from 50% to 200% of its original size without any visual artifacts. On a smaller screen such as a laptop you may wish to reduce the interface size so it doesn't dominate the display. On a larger screen or a second monitor you can increase the size to get a better view of the controls. The controls work the same at any zoom level but smaller controls can be easier to see at higher magnification levels.

i 🎵: While working with Vocoder V, you can also use the keyboard shortcuts Ctrl & +/- (or Cmd & +/-) to quickly adjust the window size.

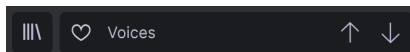
- **Audio Settings: (only available in Standalone mode)** Here you manage the way the instrument transmits audio and receives MIDI. See the section Audio and MIDI settings for more information about this topic.

i: The Audio Settings menu is only available in when using Vocoder V in Standalone mode. When using it as a plugin, the host software handles all of the parameters in this menu including audio and MIDI routing, buffer size settings, and more.

- **Tutorials:** Vocoder V comes with tutorials that walk you through different features of the instrument. Select one of the tutorials to get step-by-step descriptions of how to make the most of the Vocoder V features.
- **Help:** This section provides handy links to the Vocoder V User Guide and Frequently Asked Questions page on Arturia's website. Note that accessing these pages will require an Internet connection.
- **About:** Here you can view the software version and developer credits. Click the About window again to close it.

4.2.2. Browsing Presets

Vocoder V comes packed with lots of great-sounding factory presets and we hope you'll create many more of your own custom presets. To help you search through large numbers of presets, we have a powerful preset browser with a number of features to help you find sounds quickly.



The browsing features of the Toolbar (shown above) include the following:

- The **Preset Browser** (on the left) opens and closes the preset browser. This is covered in detail in the next section of this guide
- The **Like Button** allows you to tag presets as favorites. Click the like button to like or unlike the preset.
- The **Preset Name** is listed next in the toolbar. Clicking on the name reveals a pull-down menu with other available presets. Click on any name to load that preset or click away from the menu to close it.
- The **Arrow icons** select the previous or next preset in the filtered list. This is the same as clicking on the preset name and selecting the next option in the list, but does it with only one click.

i: The Previous and Next arrows can be MIDI mapped. This means you can use buttons on your MIDI Controller to easily step through the available presets without having to use the mouse at all.

4.2.3. Side Panel



At the far right of the Toolbar, you will find the Gear icon which when pressed opens up the Side Panel. The Side Panel gives access to various MIDI related options. In here you can set the global MIDI channel, set up MIDI controller mapping to virtually any parameter of the Vocoder V, select either a generic MIDI keyboard controller OR one of Arturia's own MIDI controllers, set up the Macros and access the tutorials.

4.3. The Lower Toolbar

The Lower Toolbar runs along the bottom of the user interface and provides quick access to several important parameters and useful bits of information.

- **Parameter Name** on the left displays the name of the parameter as you adjust controls. The current value of the control is listed in a tooltip that appears next to the control.
- **Undo** undoes the last change.
- **Redo** redoes the last change.



! The Undo and Redo buttons only become visible AFTER you have started editing on the Main Panel. Try moving the Freq (or any other) control now and you'll notice the Undo button will magically appear.

- **Undo History** lets you to see a list of recent changes. Click on a change to restore the patch to that state. This can be useful in the event you happened to go too far in your sound design and want to revert to an earlier configuration.
- **CPU Meter-Panic Button** displays the current CPU usage of the instrument and when pressed it resets all MIDI signals in the event of stuck notes or other issues.




! If the CPU meter is high, you may hear clicks, pops and other audible glitches in playback. In this case, consider increasing the audio buffer size setting. This is found under Audio Settings when working in Standalone Mode or in your host music software's preferences menu. Alternatively, you can limit polyphony with the Poly and Unison settings.

4.4. Side Panel

The Gear icon at the top right side of the upper toolbar opens up the Side Panel.

- **Settings** this sets the global MIDI channel for the Vocoder V

 By default, Vocoder V will receive MIDI data on all 16 MIDI channels (All setting). You can change this by selecting a specific channel here. You will need to do this if, for example, you want to use an external controller with multiple instances of Vocoder V. In this situation, every instance can be set to a unique channel, and you can change the preset or MIDI channel on your controller to control the different instances of Vocoder V.

- **MIDI** this section lets you set the MIDI controller you are using and setup the mapping of MIDI CC commands.

4.4.1. MIDI controller configuration



If you click on the drop-down menu to the right of where it says MIDI Controller you can set whether you're using a generic MIDI controller or one of Arturia's own. Underneath this you have the MIDI configuration dropdown menu. Here you can manage different setups of MIDI mappings for controlling Vocoder V. For example, if you have multiple hardware controllers (small "live performance" keyboard, large "studio" keyboard, pad based controller, etc.), you can create a profile for each of them just once and then quickly load it here. This saves you from having to redo the MIDI mapping assignments from scratch each time you swap hardware.

Once you have created a profile, you can save, delete, import or export it using the options in this menu.

Your MIDI Mapping profiles are listed at the bottom of this pull-down menu and the currently active profile has a checkmark next to it.

Underneath this you will see all the MIDI mappings currently setup. MIDI-assignable parameters are shown highlighted and you can map physical controls on your MIDI Controller to them. A typical example might be to map a real expression pedal to the Master Volume control, or a physical knob on the MIDI controller to the Frequency knob of the Filter module.

Purple controls are unassigned whereas red ones have already been assigned to an external MIDI control.

4.4.2. Assigning / Un-assigning controls

When MIDI Learn mode is switched on, click on any purple control to select it. Then turn a knob, move a slider or push a button on your MIDI controller. Your selected on-screen control will change from purple to red, indicating that a link has been made between your hardware control and the on-screen software parameter.

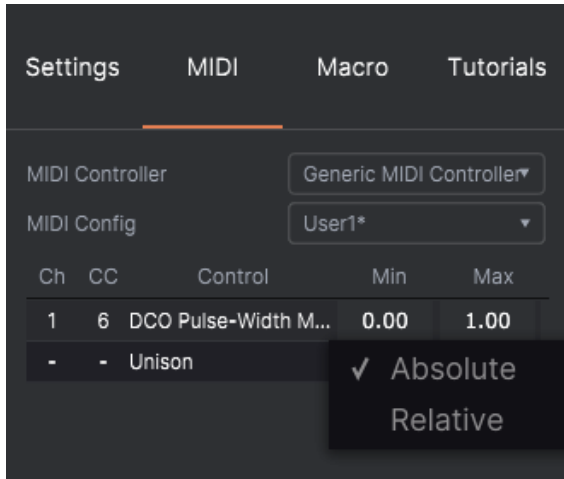


! Pitch Bend is a reserved MIDI controller that cannot be assigned to other controls.

4.4.3. Min / Max value sliders

By default, a hardware control will span the entire range of the on-screen control (i.e., from 0 to 100%). The minimum and maximum value sliders let you restrict the range something other than 0%-100%. This is very useful for making sure you cannot accidentally make the sound too quiet or too loud when performing.

4.4.4. Relative control option



If you right click on a mapped parameter in the list, you can make a parameter "absolute" or "relative". Only change to "relative" if your hardware MIDI control is sending "relative" MIDI messages. If the MIDI controller is sending out "absolute" messages leave it/bset to "absolute" (this is the more common behavior).

A "relative" change instructs the receiving device to increase or decrease its current value. The receiving device (Vocoder V in this case) interprets this command as "increase/decrease your current value." This type of control is often implemented on "endless" or "360 degree" knobs that do not have hard stops at the ends of their range. The advantage of this is that physical knobs always remain in sync with on-screen controls. However, not all hardware devices support this mode of operation which is why both options are available in Vocoder V.

i There are two common types of messages when working with MIDI knobs: Absolute and Relative. Absolute positioning sends the exact position of the knob as a specific numerical value (i.e., "Set value to 54, 55, 56, etc.") when you turn the knob on your hardware controller. This is the most common implementation and is almost always used when using potentiometer knobs with "hard" stops at the ends. One downside to this implementation is that if you change presets, your physical knob and on-screen control will be "out of sync" with each other and turning the physical control can cause the on-screen control to suddenly jump to that position.

4.4.5. Unassigning or "un-learning" a MIDI mapping

Click on an assigned parameter to highlight it then press the delete button on the keyboard to disconnect.

- **Macro** this function lets you setup the functionality of the macro section. Basically a macro lets you change a group of parameters together and there are 4 available (you can see the status of the 4 macros along the lower toolbar). The macro is selected using the back or forward arrows either side of the name and if you click on the name it can be changed.



You can add extra controls into the macro by selecting "add control" and clicking on the desired control on the panel. You will see it get added to the macro control list and you can set upper and lower limits for each control. When you tweak one of the macro controls in the lower toolbar you will see all the link controls move. Very handy indeed!

4.5. The Preset Browser in Detail

The Preset Browser is where you can search through all of the presets. Open the Preset Browser by clicking the library symbol on the toolbar. To close the Preset Browser and return to the main screen, click the "X" that appears in the Toolbar.

To narrow down your choice and help you find the sounds you want, you can enter keywords in the search bar. You can narrow your search further by clicking on one of the drop down menus under the search bar which lists categories and has tags to point you in the right direction. You can cancel the list by pressing "clear all".

The results of your search are listed in the middle column. You can easily audition any displayed preset by clicking on it and playing a connected MIDI keyboard. You can sort the list results in various ways by clicking the column headers directly above the preset names. If you're feeling spontaneous, click the Shuffle button at the top right to randomly select one preset from the results list. This is a fun and quick way to audition sounds without having to step through the list one-by-one.

Details about the currently selected preset are listed in the right column.

i : Factory presets cannot be modified, deleted or overwritten. Only "User" (user generated) presets can be deleted, overwritten or saved under a different name. This is done by using the "Delete" "Save" or "Save As" buttons at the bottom of the right column. If you have modified a Factory preset and would like to save it, you must save your modified preset under a different name (only the "Save As" option appears in this case since you cannot delete or overwrite factory sounds).

4.5.1. Browse Presets With MIDI Controller

This option allows you to browse presets using the Browse knobs on Arturia MIDI Controllers. This makes it incredibly efficient to quickly audition sounds without having to reach for the mouse. To use this feature, select your Arturia controller from the menu and its Browse knob will be automatically mapped to preset browsing.

4.5.2. Playlists

In the lower left corner of the Preset Browser window is a feature titled Playlists. This is used to collect presets into collection groups, such as a set list for a particular performance or a set of presets related to a particular studio project.

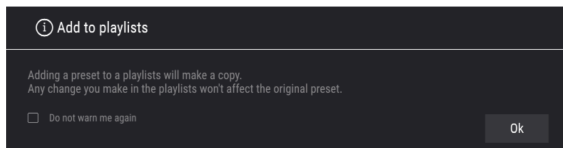
4.5.2.1. Add a playlist

To create a playlist, click the **+ New Playlist** button. Give the playlist a name and it will appear in the Playlists menu. To rename the playlist at any time, double click on the name.

4.5.2.2. Add a preset to the playlist

You can use the Search window to locate the presets you want to add to your playlist. Once you have found the right preset, click and drag it onto the playlist name on the left.

You will see a message which tells you that the new preset will be duplicated. Vocoder V will create a copy of the preset so that you can modify settings in the playlist presets without impacting the original preset it is based on, and vice versa.



To view the contents of a playlist, click on the playlist name.

4.5.2.3. Re-order the presets in the playlist

Presets may be reorganized within a playlist. For example, to move a preset from slot 3 to slot 1, drag and drop the preset to the desired location.

This will move the preset into the new location.

4.5.2.4. Remove a preset from the playlist

To remove a preset from a playlist, right click on the preset name.

4.5.2.5. Delete a playlist

To delete a playlist, right click on the playlist name.

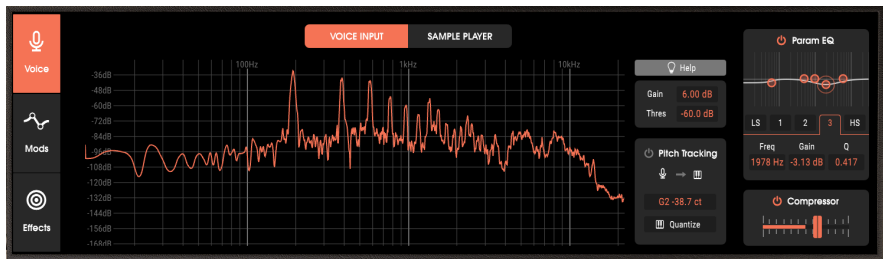
5. VOICE PAGE

5.1. Voice Page Basics

Clicking on the Advanced button opens the Voice panel, which feeds a signal that modulates the synthesizer's audio. This is what creates "talking instrument" and other effects. The Voice page has two sections:

- The Voice Input feeds audio signals into Vocoder V in real time, such as audio from a microphone or drum machine.
- The Sample Player plays back pre-recorded samples, which you trigger from a keyboard. Note that both modules cannot be active at the same time—for example, you cannot play back samples and vocode a microphone signal simultaneously.

5.2. Voice Input



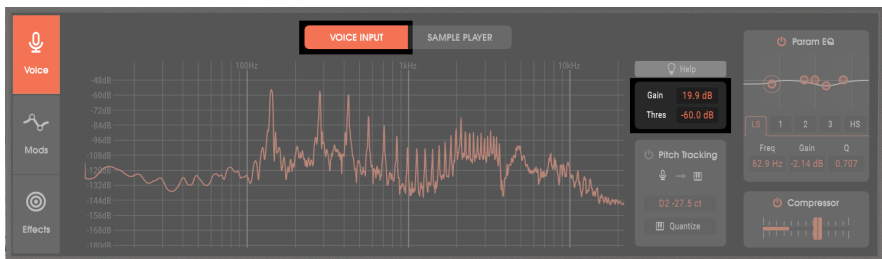
The Voice Input section controls the external signal coming from a DAW's track, or an audio interface's mic input in standalone mode. To simplify setting gain, the Visualizer screen shows the signal level and frequency spectrum.

5.2.1. Help



Different DAWs have different ways of routing signals from a DAW track or bus. Click on Help for routing instructions about supported DAWs.

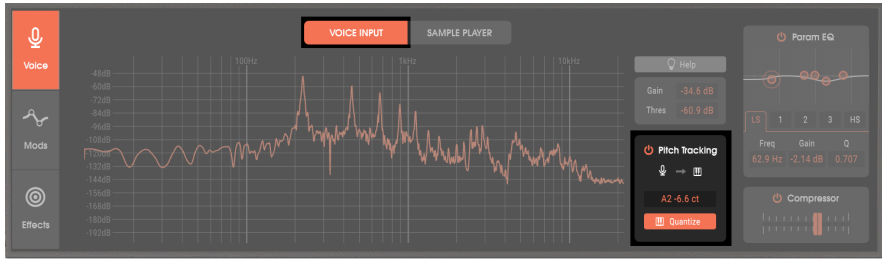
5.2.2. Gain and Threshold



Gain (-36 dB to +24 dB). Set this for the optimum input level to Vocoder V. Ideally, peaks will reach, but not exceed, -18 dB. There is another level control in the vocoder section to set the modulation level; think of that as the master level control, and Gain as the preamp gain control.


Threshold (-70 dB to +6 dB). The input must exceed the threshold to trigger a note-on message to the synthesizer. Similarly, when the input goes below the threshold, it triggers a note-off message. Always adjust Threshold after adjusting Gain.

5.2.3. Pitch Tracking

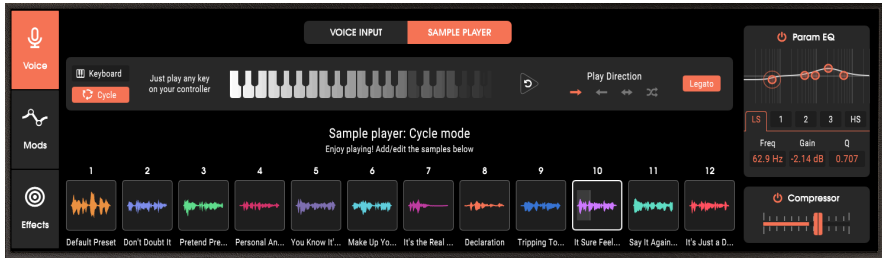


Vocoder V can detect the pitch of a monophonic input signal, and use that to trigger the same pitch in the synthesizer keyboard. This allows playing the keyboard by singing, playing single-note lines on guitar, using wind instruments, and so on—exactly as if you had hit a key. This also means the Hold and Chord functions work with pitch-tracked notes, and pitch bend will bend the notes as well.

To make sure that all pitches snap to a standard chromatic scale, enable Quantize. The readout above the Quantize button shows the detected pitch. Because the Pitch Track function has a bypass button, you can add in pitch-tracked notes as desired. Furthermore, the keyboard and pitch tracking features can operate simultaneously. For example, you could hold a chord on the keyboard, and sing a solo line.

i  Singing while holding a chord is a fantastic technique for choir parts. The chord provides the choir part, while singing “ahhh” can add a melody that supplements the choir.

5.3. Sample Player



The Sample Player feature is unique to Vocoder V. It stores up to 12 mono or stereo audio files of essentially unlimited length, which play back monaurally. Thus, these samples can provide audio to the vocoder section without needing to route a microphone or other sound source to the vocoder. This makes it possible to play Vocoder V more like a traditional keyboard instrument. Also, samples are saved with presets, so that recalling the preset recalls the samples.

You can play back sample files in sequence, select them individually for playback, add custom start and end points, loop the files or sections of the files, and/or trigger them from a controller.

The Sample Player has two modes: Play mode for playing and triggering samples, and Edit mode for editing samples—change gain, set start and end points, loop, and more.

5.3.1. Loading Samples

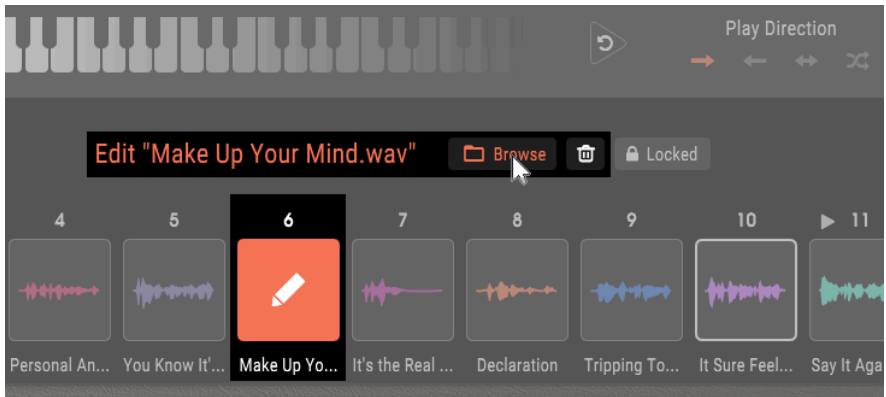
The Sample Player accepts .wav, .aiff, .aif, and .flac formats. There are two ways to load samples into individual sample cells—drag and drop, or load from a sample library. With either method, loading a sample into a cell with existing audio replaces it with the new audio.

Loading a file into a cell color-codes it automatically. Colors provide an easy way to identify samples when triggering from the keyboard controller, because the key that triggers a particular sample has a colored dot above the key that correlates to the sample's color.

5.3.1.1. Load with Drag and Drop

Drag-and-drop a file from your computer, DAW, explorer, cloud storage, or wherever a file is accessible into one of the 12 individual cells. You can copy a sample from one cell to another with Alt+drag. To isolate different sections from the same sample, such as words from a phrase, you can set start and end points, as described later.

5.3.1.2. Load a File from Disk

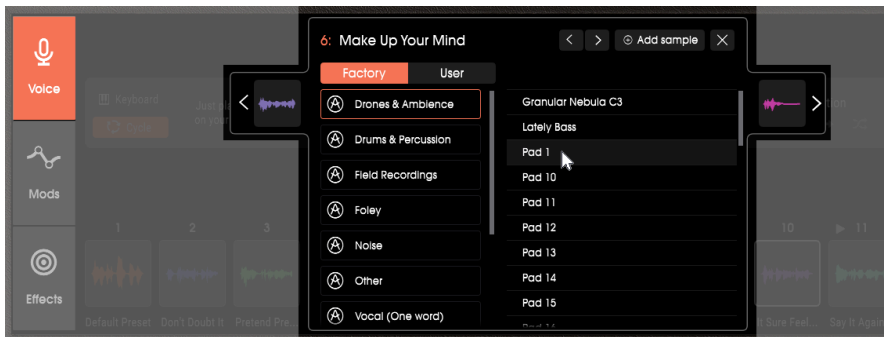


Hover over a cell, and you'll see the cell graphic change to a Pencil. This means you can edit the cell in various ways.

To delete the cell's sample, move the cursor above the cell, then move sideways to click on the trash can.

To load a new sample, click on Browse. This opens the sample library, as described next.

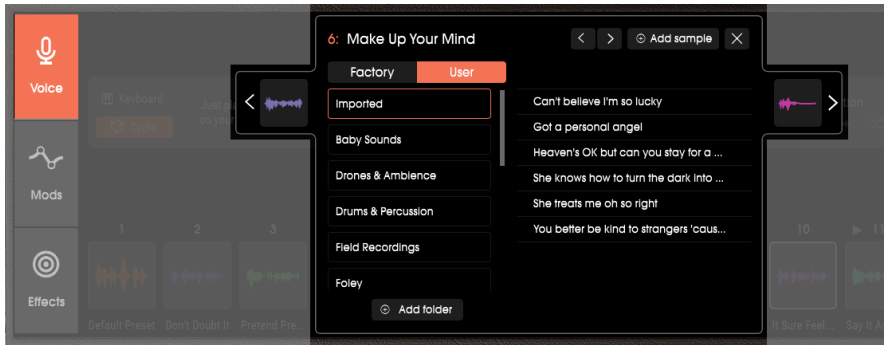
Load a Sample from the Factory



Click on the Factory tab, as shown above, to show the samples that ship with Vocoder V. Clicking on a folder (in this case, Drones & Ambiences) shows the available samples in that folder. The cursor is about to click on Pad 1 to load that sample into cell 6, which currently has the sample Make Up Your Mind. If the cell had been empty, it would have said Empty instead.

The left and right arrows navigate to the previous or next cell, respectively. This makes it easy to load samples into different cells without having to leave the sample library. Note: navigation wraps around, in other words, the next cell after 12 is 1, and the previous cell before 1 is 12.

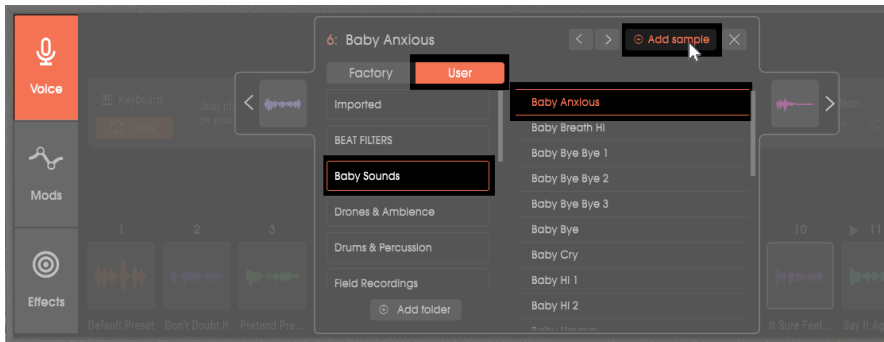
Load a Sample from the User Library



The procedure is the same as loading from the Factory library, except that you click on User instead.

Load a Sample from Anywhere

You can import a sample from any source, not just existing folders. First, select the User folder where you want to import the samples. There's already an Imported folder as well as some other categories, but you can add a new folder (see the next section) and select that instead. Then, click on +Add Sample. Navigate to the sample and click on Open. The sample will now appear in the folder you selected.



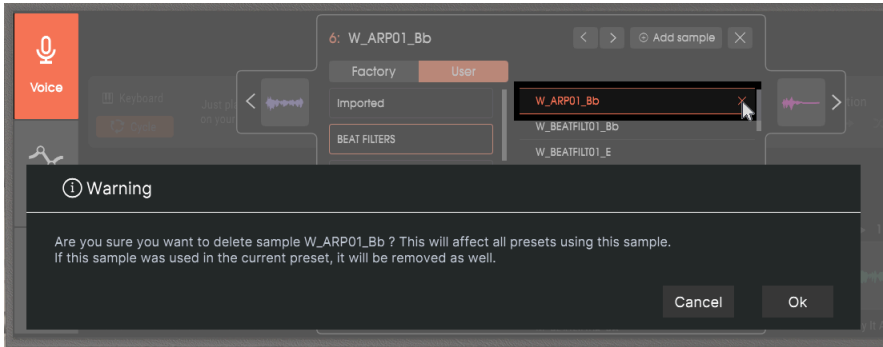
In the image above, clicking on Add Sample while in the User library, and navigating to the Baby Anxious file, added it to the selected file (Baby Sounds).

You cannot add a sample to the Factory library. If you try to do so, the User library will be selected automatically, and the sample will be placed in the first User library folder.

Add a New Folder for User Library Samples

To create a new folder category in the User library, click on + Add Folder. This opens your operating system's standard file browser. Navigate to the desired folder, select it, and click on OK. Note that only samples within that folder will be recognized. Vocoder V ignores nested folders (folders within folders).

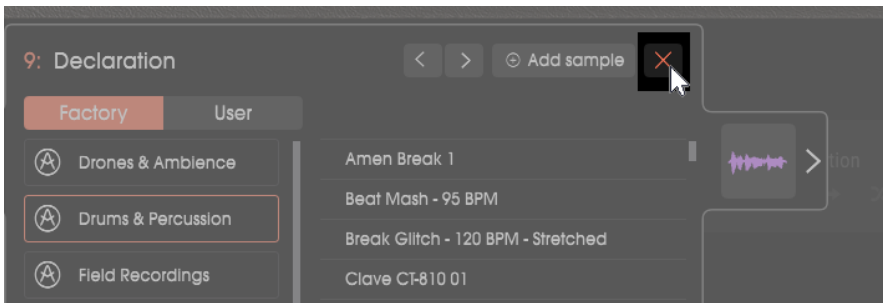
Delete Library Samples



With the Sample visible and selected, click on the close box to the right of the sample name. You will be warned that this will delete your sample not just from the current Preset, but from the Library—so if you use this sample in other Presets, don't delete it.

i For Windows, samples are saved in the file path C:\ProgramData\Arturia\Samples\Vocoder V\User. For Mac, the path is /Library/Arturia/Samples/Vocoder V/. This is not part of the Vocoder V program, so if a problem happens like a hard drive crash and you need to re-install Vocoder V, these files will not re-appear when you re-install Vocoder V. Back these up separately to make sure you can access them in the future.

Close the Sample Library



Click on the Library's close box, or any other buttons on the user interface outside of the Library window.

5.3.2. Playback Mode

Individual samples play back using one of two modes, Keyboard or Cycle. Only one sample playback mode can be active at a time.

5.3.2.1. Keyboard Mode



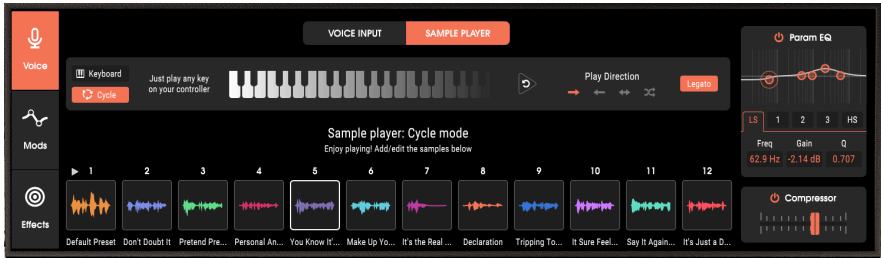
This mode reserves the lowest keyboard octave (starting with C1) to trigger samples instead of triggering synthesizer notes. The other keys trigger the synthesizer (carrier) as usual.



Each sample is assigned to a note, with a colored dot above the key corresponding to the sample's color coding. Note in the two images above how the colored dots on the keyboard correspond to the sample colors.

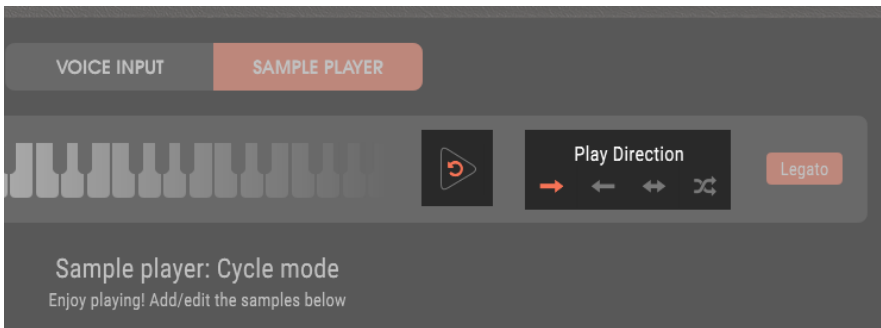
To trigger a sample, play the corresponding note. Then, use the other octaves to impart pitch to the sample that's playing back. A progress indicator inside the cell shows how much of the cell has played back. As long as the sample remains triggered (i.e., you haven't triggered a new sample with the lowest octave keys), if you play new notes before the sample has stopped playing, playback restarts at the beginning of the sample.

5.3.2.2. Cycle Mode




With this mode, each new note or chord triggers the next sample in the chain, based on the selected Play Direction, as selected to the right of the keyboard graphic.

Play Direction Controls

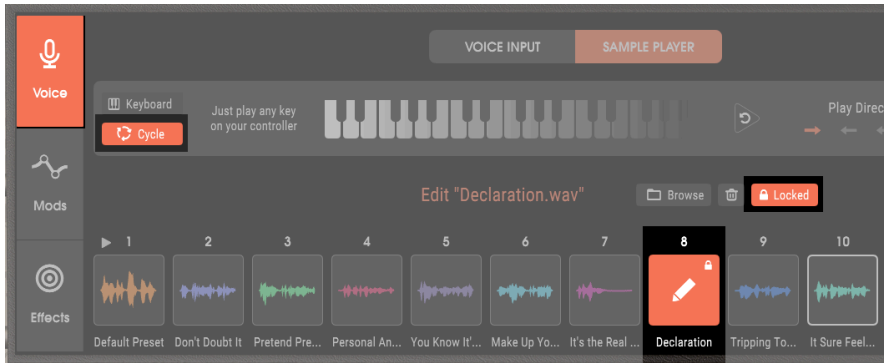


Play Direction options through the chain are forward, backward, forward/backward, and random.


Clicking the Reset button to the left of the Play Direction options returns playback to the chain's beginning.

 A MIDI Start message also performs a reset.

Lock a Sample's Position



In Cycle playback mode, it can be difficult to edit a sample because playing a different keyboard key chooses the next sample in the chain. To Lock an individual sample to playback, hover over the sample until the Pencil (edit) graphic appears. Next, click on the Locked button; the sample cell itself will also show a lock to confirm that it's locked. When locked, that sample will always play when triggered by the keyboard until it's unlocked. To unlock, click on the Locked button again.

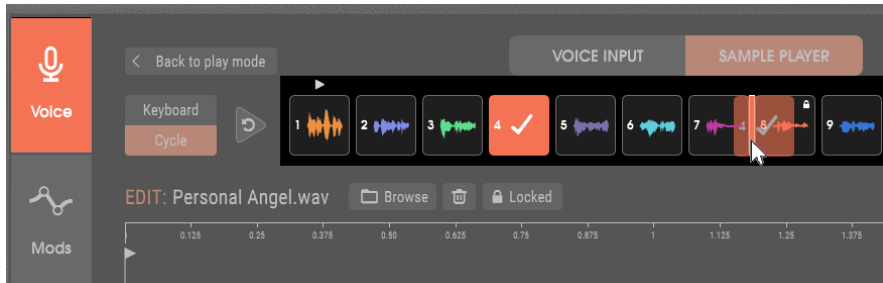
 Deleting a sample automatically removes the cell's locked status.

5.4. Editing Samples

Beyond loading and arranging samples, you can edit samples with either Keyboard or Cycle mode selected. Editing operations apply to individual samples, not globally, even if the same sample is in more than one cell.

To enter edit mode, hover over a sample until the Pencil (edit) icon appears, then click on the cell. To exit edit mode, click on Back to Play Mode, toward the upper left.

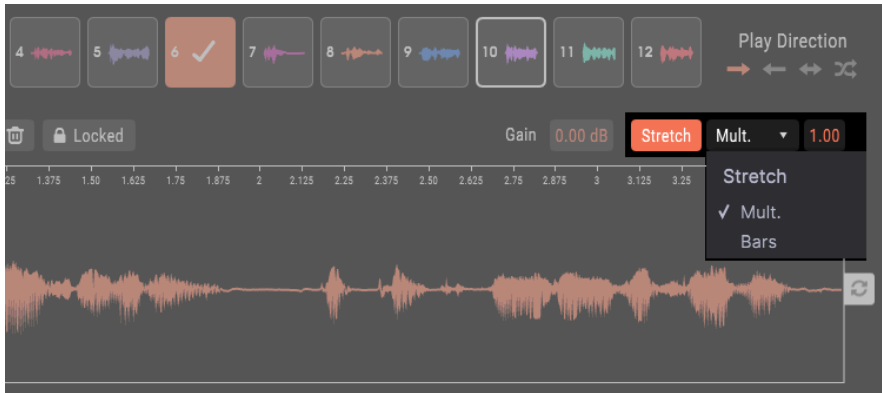
5.4.1. Change the Order of Samples in the Chain



Click on a cell and drag it to the desired position. In the image above, cell 4 is being dragged between cells 7 and 8. When you change a sample's position it retains its color coding, however, its number will change to reflect the new position in the sample chain.

To swap samples, drag one cell on top of another cell (e.g., if you drag cell 8 on top of cell 2, cell 2 will now contain the sample that was in cell 8, and cell 8 will contain the sample that was in cell 2).

5.4.2. Time-Stretch a Sample



While in a sample's edit mode, click on the Stretch button. If the sample has Start and End points (see the next section), stretching applies only to the region between these points.

Click on the drop-down menu to the right of Stretch to choose between Multi (specifies a multiple of the sample duration, from 0.125 to 4 times), or Bars (1/32 note to 8 bars). After making your selection, click on the field to the right of the drop-down menu, then drag up or down to choose the new duration in Multi or Bars. The sample syncs to the host tempo when Vocoder V is a plug-in, or to the internal tempo in stand-alone mode (under Audio Midi Settings).

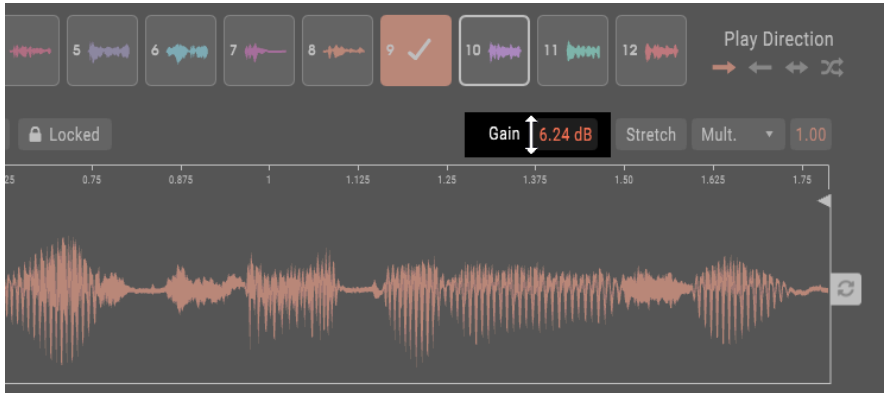
5.4.3. Set Start and End Points



There are two handles just below the sample's Time Ruler. Initially they are at the sample's beginning and end, but as shown above, you can drag them to specify where sample playback begins and ends. The cell number appears on a label that attaches to the Start marker. Note that the Start and End point handles are independent, so changing one doesn't change the other's position.

i To return a start or end marker to its default position, double-click on it.

5.4.4. Change Sample Gain [Level]



To change a sample's gain, for example to match the level of other samples in the chain, click in the Gain field, and drag up or down to apply -36 to +24 dB of gain to the sample.

5.4.5. Sample Zoom In and Out



Zooming in allows placing the Start and End points (or Loop points, see next section) more precisely. The image above shows the previous image, but zoomed in. To zoom in or out, hover over the Time Ruler so that the cursor turns into a hand.

- Click and drag down to zoom in.
- Click and drag up to zoom out.
- Click and drag sideways to move the timeline right or left.

5.4.6. Looping Within the Sample



You can forward-loop an entire sample, audio within a sample, or audio within the sample start and end points.

To create a loop, the waveform must be fully zoomed out. Click on the loop symbol attached to the end point handle. Handles appear at the sample start and end, but unlike the start and end point handles, the loop handles are at the bottom of the waveform, not the top.

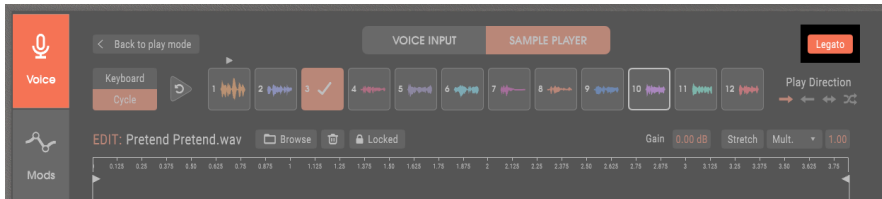
To adjust the loop points, click on the Loop Start handle and set the loop start. Then click on the Loop End handle and set the loop end.

A loop cannot extend past the sample's start or end point. So if you move the sample start later than the loop start, the loop start will be the same as the sample start. If you move the sample end earlier than the loop end, then the loop end will be the same as the sample end.

After defining a loop, moving the Loop Start handle also moves the Loop End handle by the same amount to maintain the same loop length. However, the Loop End handle moves independently. This allows defining a loop length, and then moving the loop with the Loop Start handle, to find the loop's optimum placement.

To turn off looping, click again on the looping symbol attached to the end point handle. The loop handles disappear.

5.4.7. Legato Mode



The Legato control is global for all samples that are loaded in the Sample Player.

In Cycle mode with Legato active, the current sample will continue playing, even if you play new notes—as long as at least one other note is being held down when you play the new note. The new notes will still change the Carrier's pitch. With Legato disabled, any new note on triggers the next sample.

In Keyboard mode, playing legato is irrelevant if you're triggering samples only from the reserved octave of notes. However, it does matter in the following situations.

- If no reserved octave notes or synthesizer notes are held, a new synth note will retrigger the last played sample from the start.
- When holding a reserved note, playing new synthesizer notes will retrigger the sample if Legato is off. If Legato is on, the sample will continue playing.
- If a sample has not played all the way through and you release the note triggering it, the sample will continue playing to the end as long as synthesizer keys are held down and Legato is on. If Legato is off, playing new notes will retrigger the sample.

5.5. Param EQ and Compressor



These effects can help optimize the Voice Input or Sample Player signal before it goes to the vocoder section. The settings are the same regardless of which input is chosen.

The EQ is the same as the Param EQ in the Effects section, except that it doesn't have a Wet/Dry control.

The Compressor has a single slider control. Moving the slider to the right increases compression, while moving the slider to the left lowers compression. Automatic makeup gain compensates to keep a constant output level, regardless of the amount of compression used.

The EQ is before the compressor, so if you add extreme EQ settings, the compressor can keep them under control.

6. CARRIER SYNTHESIZER

The synthesizer that generates sound for the Carrier takes full advantage of Arturia's experience in creating award-winning virtual instruments. Vocoder V's synthesizer generates sounds that are optimized for being controlled by the Vocoder's modulator.

6.1. The Virtual Keyboard



The keyboard does more than just play notes, because it can also trigger samples. The toolbar below the keys with four distinct sections: Polyphony Selection, Undo/Redo Management, CPU meter/Panic button, and four user-assignable Macro controls.

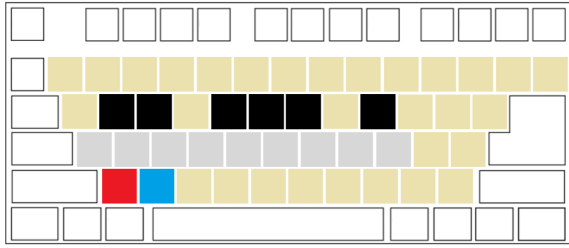
6.1.1. Keys



The virtual keys can trigger the Carrier synthesizer at different velocities by clicking on them. Click toward the bottom to produce higher MIDI velocities, and toward the top for lower MIDI velocities. These keys also show which keys are being played by incoming MIDI data (for example, from a MIDI keyboard controller).

You can also trigger keys with your computer keyboard. In the image below, the gray keys correspond to the virtual keyboard's white keys, and the black keys correspond to the virtual keyboard's black keys. The range starts in the octave above the 12 lowest notes that are used for triggering samples (see section 6.1.3)

You can also trigger a limited range of keys with your computer keyboard. In the image below, the gray keys (standard English language keyboard keys A-S-D-F-G-H-J-L) correspond to a keyboard's white keys, and the black keys (standard English language keyboard keys W-E-T-Y-U-O) correspond to a keyboard's black keys. The red key (Z) transposes down, and the blue key (X) transposes up.



6.1.2. Wheel Controllers



Bend is a standard, return-to-center pitch bend control with range set by the Bend Range control (described later).

Mod is standard wheel control for introducing modulation, as described in chapter 8. It can stay in one position if not moved. Note that it does not return to its default position when double-clicked.

6.1.3. Sample Player Trigger Keys



When using the Sample Player in Keyboard mode, the C1 octave (the lowest octave in the virtual keyboard) is reserved for playing back samples, from either the keyboard or from MIDI data. The colored dots above the keys correspond to the sample colors in the Sample Player. With Voice Input, or the sample player in Cycle mode, these keys play back pitches, like the other keyboard keys.

6.2. VCOs

The synthesizer architecture uses two VCOs. These are the sound generators that produce the Carrier's waveforms.

6.2.1. VCO 1 and VCO 2 Common Controls



Waveform chooses triangle, sawtooth, square, or white noise for the VCO. Waveforms with more harmonics, like the sawtooth, provide the most intelligible vocal sounds. Modulating noise sounds almost like a crowd shouting.

Shape changes function depending on the selected waveform.

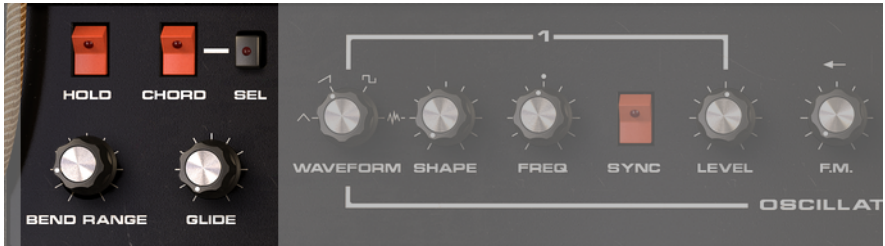
- **Square wave** Changes the pulse width
- **White noise** Changes the sound's color (tonality).
- **Triangle and Sawtooth** Applies Arturia's wavefolding process, which folds the peaks of the waveform downward to change the sound's high-frequency content. When fully counter-clockwise, each waveform has its most traditional shape and sound. Turning Shape clockwise increases the perceived high-frequency content.
- **Freq** transposes the oscillator frequency ± 60 semitones. For example, transposing Osc 2 +12 semitones gives a higher voice timbre, while -12 semitones gives a deeper voice timbre.
- **Level** controls the VCO's output amplitude.

6.2.2. VCO 1 and VCO 2 Unique Controls



- **Sync** (VCO 1). Produces the "hard sync" effect associated with analog synthesizers. When enabled, varying VCO 1 Freq does not change the pitch, but only the timbre. VCO 2 Freq sets the master keyboard pitch.
- **FM** (VCO 1 and 2). VCO 2's output signal modulates VCO 1, which can produce clangorous, dissonant effects when the two sounds interact.
- **Fixed** (VCO 2). Maintains a constant pitch for VCO 2 that does not change as you play different keys.
- **Fine** (VCO 2). Tunes the oscillator pitch in cents, as opposed to the semitone intervals implemented in the Freq control.


6.3. Synthesizer Global Controls




The Global controls apply to both synthesizer oscillators. We'll first cover the left set of controls.

- **Bend Range** Sets the range covered by the Pitch Bend wheel, from ± 1 semitone to ± 24 semitones.
- **Glide** Specifies a variable time (up to 10 seconds) for a note's pitch to slide continuously to the next note, if just before removing your finger from a note, you play the next note. For example, if you play C, set Glide to 1 second, and play G an octave higher, the pitch will slide up from C to G. If you play G, set Glide to 1 second, and play C below the G, the pitch will slide down from G to C. This works with single notes or chords.

However, Glide also works with chords even if you lift your fingers off the keys between playing those chords. Notes will glide up to the chord if you hit the lowest note of the chord first (even if the previous chord you played was higher in pitch), or glide down if you hit the highest note of the chord first (even if the previous chord you played was lower in pitch). This allows for a variety of creative playing techniques and ways to do slides.

i : With Hold enabled, you can add a note and Glide will slide up or down to the new note while the original note stays on pitch. You can do this for as many notes as you like to create novel sliding effects.

- **Hold** sustains a note or chord indefinitely when enabled, even after you lift your fingers from the keys, when using the Voice Input. With the Sample Player, the note or chord will sustain for the length of the sample. If you turn off Hold, the Carrier will provide a signal only as long as one or more keys are held down.
- **Sel and Chord** These work together to create one-finger chord play. Click on Sel to enable a pop-up Chord Selection window. There are 11 factory chord types. Orange keys indicate the notes that make up the chord. The Custom option lets you create your own chord type by clicking on the Chord Selection keyboard.

i : Click on a key in a factory chord type to switch instantly to Custom. Then you can make whatever changes you want to the factory chord type, and it will become a new custom chord type.



After choosing the chord, enable Chord. Now, hitting the root note of a chord will play the full Chord type you chose with the Chord Selection function.

Here are the Global controls toward the right side.



- **Attack** Applies an amplitude envelope fade-in time to the synthesizer and sample player envelopes, from 0.002 to 20 seconds. This allows fading in on a sound automatically whenever you play a key or keys.
- **Release** Sets the time for the synthesizer and sample player envelopes to fade out after you release your fingers from the keys, also from 0.002 to 20 seconds.
- **Ensemble** Adds a rich, thick quality to the sound, like synthesizers playing in an ensemble. Turning it further clockwise thickens the sound and widens the stereo image.
- **Master Tune** Changes the base pitch from the standard A = 440 Hz concert pitch to as low as 400 Hz, or as high as 480 Hz. Use this to accommodate out-of-tune instruments, or with certain types of music that are not based on the A = 440 Hz pitch standard.

7. VOCODER SECTION



The Modulator and Carrier synthesizer meet in the Vocoder section. It's based on an iconic 16-channel design, but includes several additional features.

7.1. Input Section



To optimize levels going into the Vocoder, both the Modulator (Voice) and Synth (Carrier) have level controls with a range of -75 dB to 0 dB gain. Don't set the levels too low, but avoid lighting the red clipping indicator to the right of either level control.

To monitor what the Modulator and Carrier are feeding into the Vocoder, the Preview buttons (headphone icon) solo one or the other (you can't solo both simultaneously). The Preview button settings are intended for diagnostic purposes, and are not saved as part of projects or presets.

i 🎵 To play the Vocoder V carrier like a standard synthesizer, click its Preview button. It won't be affected by the Effects settings, but the Envelope Follower, LFO, and assigned controls in the Advanced panel's Mods section will still influence the sound.

7.2. Envelope and Character Controls



The Times controls affect how the modulator's envelope controls the bands.

Attack (1 ms to 1 second) When a modulation signal appears after silence, Attack fades in the modulator signal level based on this control setting. Increasing attack can smooth the beginning of a sound, or reduce transients.

Release (10 ms to 30 seconds) After the modulator signal stops, this sets a release time over which the Carrier's amplitude envelope decays. This allows the Carrier to fade out after the modulation signal ends, instead of ending abruptly.

The two controls for Bands change the vocoder's character and timbre.

Shift Turn counter-clockwise to lower the band frequencies (darker sound), or clockwise to raise the band frequencies (brighter sound).

Width Changes the bandwidth of the 16 vocoder filters. Turn counter-clockwise for a thinner, more synthetic sound, or clockwise for a broader, more natural sound.

7.3. Band Level Controls and Meters



The 16 sliders control the output levels of the Carrier synthesizer's bands. Use this feature to reduce the levels of bands whose frequencies conflict with other instruments, or increase levels with bands that help increase intelligibility.

There are two ways to change the slider levels.

- Click on a slider and move it.
- Click on a slider, then drag over the other sliders to "draw" a curve.

Each band also has an audio meter that shows the band's pre-fader output level.

7.4. High Frequency and Balance



The voice produces three main sonic elements: vowels, consonants, and fricatives. Fricatives are a particular type of consonant, created by sounds that constrict the vocal tract (like S, Z, V, F, and H). Vocoders are good at reproducing vowels and most consonants, but high-frequency fricatives are difficult to reproduce with conventional filtering. The High Freq controls pass high frequencies through to the vocoder to increase intelligibility.

Switched/Direct Switch Switched adds high frequencies only when they're present and fairly strong (a gated action), and is preferred for robotic/synthetic sounds. Direct feeds high frequencies through at all times, which can sound more natural.

Level Adjusts the level of the high frequencies inserted into the vocoder. Use this to provide the best balance with the vowel and consonant sounds.

Balance Varies the balance of the white noise that's sent when high frequencies are detected (Hiss setting) with the "buzz" sound generated when the vocoder reacts to high-frequency sounds (Buzz setting). Middle settings tend to sound more natural.

Fast/Slow When fast, high frequencies appear as more of a percussive burst. Slower speeds create a less percussive effect.

7.5. Master Output Section

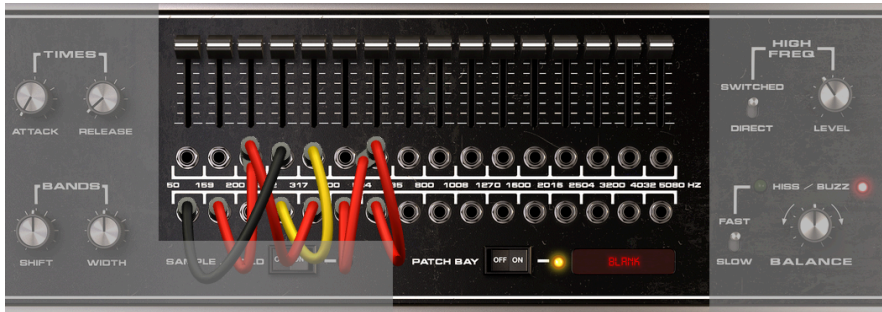


These controls are post-vocoder, and affect the output going to whatever is next in a system (channel fader, another plug-in, bus input, etc.).

Master Volume Adjusts the overall output level from -60 dB to 0 dB. Set this low enough to avoid distortion in whatever follows Vocoder V.

Mix Choose the ratio of dry sound to vocoded sound. To add some of the input in with the vocoded sound, turn the Mix control more to dry.

7.6. Patch Bay



The Patch Bay allows for creative, innovative vocoder effects. In a standard vocoder, a Modulator band controls the same frequency band for the Carrier. With the patch bay, the analysis signals from any Modulator band (top row of jacks) can provide signals to articulate the Carrier synthesizer's bands (bottom row of jacks).

7.6.1. How to Use the Virtual Patch Cables.

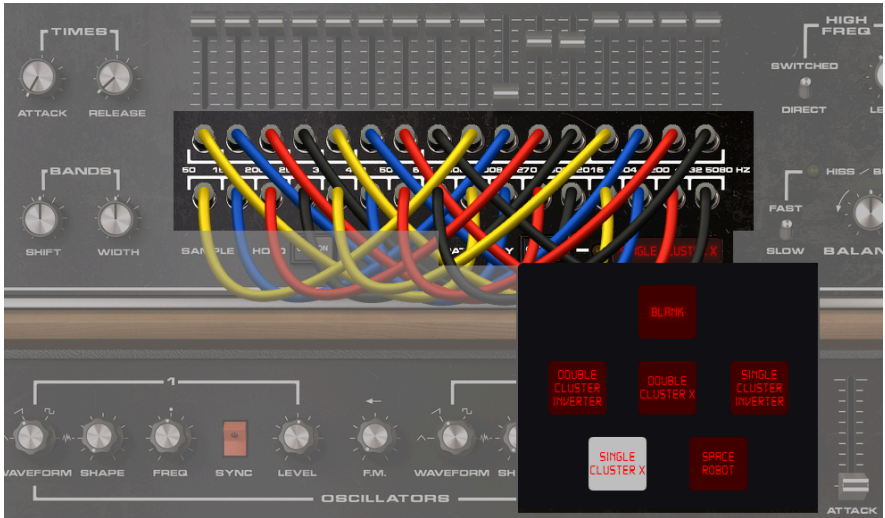
To use an analysis signal derived from the Modulator to articulate a band in the Carrier's synthesizer (or vice-versa), click on a jack and drag the virtual patch cord to the desired destination. An analysis jack can patch into a maximum of three synthesis destinations. However, a synthesis band destination can receive only one analysis signal.

To disconnect a patch cord, right-click on a jack at either end of the patch cord. Or, click on a plug that connects to a synthesis band, drag it anywhere other than another synthesis band, and then release the mouse.

7.6.2. Patch Bay Bypass

The Patch Bay switch can bypass the current patch bay set up without having to remove the patch cables. Switch Off to bypass, or On to use the current patch bay setup.

7.6.3. Patch Bay Presets



To open a pop-up menu with several patch bay presets, as well as a Blank preset that restores the patch bay to its default position (no patch cords), click the field to the right of the Patch Bay bypass switch. Click a preset to select it. Although custom patch cord configurations cannot be saved as their own presets, they will be saved along with a Vocoder V preset.

7.7. Sample and Hold

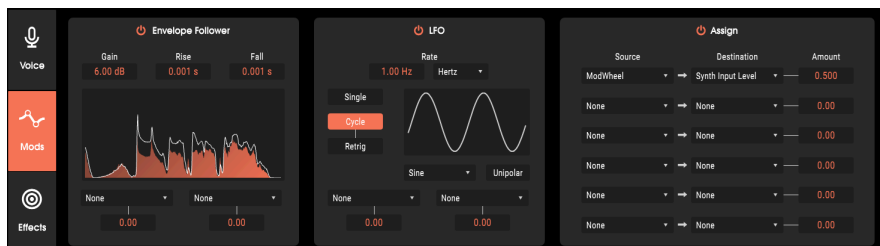


Sample / Hold Switch On to hold the levels of the modulator control outputs that feed the Carrier bands. Any Carrier keys you play will all be affected the same way by the held modulator control outputs. Switch off Sample / Hold to return to normal operation.

8. MODULATIONS SECTION

8.1. Modulation Overview

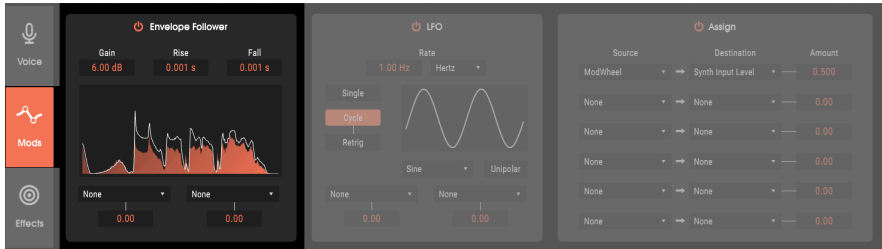
Modulation prevents electronic sounds from becoming static, by creating changes in those sounds. This can increase expressiveness, add interest, and give more sonic variety.



Modulation requires a minimum of two elements: a modulation source that provides control signals, and a destination that the modulation will influence. For example, vibrato and tremolo are common examples of modulation sources. Vibrato adds periodic pitch changes with pitch chosen as a destination, while tremolo provides periodic amplitude changes with amplitude chosen as a destination.

Vocoder V has two main modulation sources (Envelope Follower and LFO), five auxiliary modulation sources (you can also select None as a modulation source), and 30 available destinations. We'll describe the sources first, and then the destinations, because the same set of destinations is available for all source modulation signals.

8.2. Envelope Follower



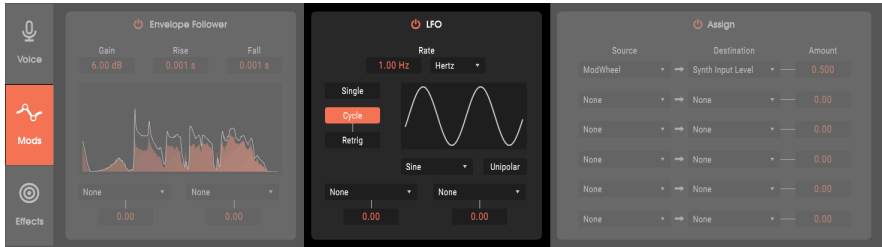
The Envelope Follower control signal represents the amplitude of either the Voice Input or Sample Player from the Voice section, after it has gone through the Param EQ and/or Compressor effects (see section 5.4). The Envelope Follower graphic shows the waveform in orange, while the white line shows the result of any smoothing added by the Rise and/or Fall controls (see next). A power on/off switch enables or bypasses modulation from the Envelope Follower.

8.2.1. Envelope Follower Controls

- **Gain** (-60 to +30 dB). Because the Envelope Follower depends on the input signal amplitude, Gain allows matching the input signal to the Envelope Follower to cover the optimum control range.
- **Rise** (0.001 to 5 seconds). This is like an amplitude envelope's attack time. If the envelope has too fast an attack, use this to slow the attack time.
- **Fall** (0.001 to 5 seconds). If the envelope ends too abruptly, this parameter adds a decay to prevent an abrupt transition.

The Envelope Follower output can route to two independent destinations. See section 8.4.2 for information on selecting destinations and assigning modulation sources to them.

8.3. LFO (Low-Frequency Oscillator)



The LFO is polyphonic, so every voice in the Carrier has its own LFO, controlled by the parameter values in the LFO section. The LFO provides six waveform shapes, which can run continuously or be triggered in various ways. The LFO display shows the selected waveform, and how it's affected by the following controls.

8.3.1. LFO Controls

- **Waveform** Choose the waveform shape from the drop-down menu below the waveform graphic: Sine, triangle, sawtooth, ramp (positive-going sawtooth), square, and SnH (Sample and Hold, a random output derived from sampling noise).
- **Rate** (0.001 Hz to 200 Hz, or rhythmic values). The left Rate parameter sets the LFO speed if the Rate parameter on the right is set to Hertz. If the Rate parameter on the right is not set to Hertz, then Rate chooses one of the following rhythmic values to sync the rate to tempo: 8, 4, 2, or 1 measure, or 1/2, 1/4, 1/8, 1/16, or 1/32 notes. Setting the parameter to the right to Binary chooses the preceding note values. Setting it to Dotted chooses dotted values (i.e., the rhythmic value + half the rhythmic value), while Triplet chooses triplet values for these notes.
- **Single** Playing a note on the keyboard generates one cycle of the LFO waveform. If Single is selected, Cycle is not available.
- **Cycle** The LFO cycles through its waveform continuously. If Cycle is selected, Single is not available.
- **Retrig** This is available only in Cycle mode. Pressing a key re-triggers the LFO to start at the beginning of its cycle. For example, if the Rate setting is several measures, you can initiate the LFO's cycle when you hit a key, regardless of the LFO waveform's current position.
- **Unipolar** When selected, the LFO applies only a positive control signal to the destination. When de-selected, the LFO applies positive and negative control signals to the destination. Unipolar is useful if you don't want a target parameter to go below a certain level (e.g., the default level is set low, so you don't want additional modulation to lower it, only raise it).

The output can route to two destinations. See section 8.4.2 for information on selecting destinations and assigning modulation sources to them.

8.4. Assign Section



Unlike the dedicated Envelope Follower and LFO modulations, this general-purpose modulation section has six slots into which you can insert a modulator, and then apply that modulator to a destination. All modulator sources control the Carrier voices polyphonically, except for the Mod Wheel, which affects all Carrier voices at once.

The Controls section Source and Destination are chosen from drop-down menus.

8.4.1. Control Sources

- **Carrier Envelope** The Attack/Release envelope from the carrier synth serves as the source.
- **Velocity** This represents the dynamics with which you play your keyboard, or other dynamically responsive controller.
- **Keyboard** Pitch acts the modulation source. The amount can be positive (keys higher than C3 send a progressively higher control signal; keys lower than C3 send a progressively lower control signal) or negative (keys higher than C3 send a progressively lower control signal; keys lower than C3 send a progressively higher control signal).
- **Aftertouch** This source, also called pressure, corresponds to how hard you press on a keyboard key after it's down. In stand-alone mode, Vocoder V responds to channel or polyphonic aftertouch, depending on what it receives. Channel aftertouch transmits a control signal that represents the highest aftertouch value in a group of keys that have pressure applied to them. Polyphonic aftertouch generates a separate control signal for each key to which pressure is being applied, but is not available as a modulation source when Vocoder V is used as a plug-in.
- **Mod Wheel** Although this controller usually adds vibrato with synthesizers, it can perform many other control functions.

8.4.2. Applying Control Sources to Destinations

The Envelope Follower, LFO, and sources in the Assign section can send control signals to 30 different destinations. The Envelope Follower and LFO can send to two different destinations simultaneously; the Assign section assigns one Source to one Destination.



The screen shot shows the available Destinations.

None	Vocoder Shift
Osc 1 Level	Vocoder Width
Osc 2 Level	Vocoder Sample/Hold
Osc 1 Freq	Synth Input Level
Osc 2 Freq	Voice Input Level
Osc 2 Fine	Master Volume
Osc 1 Shape	LFO Rate
Osc 2 Shape	LFO Amplitude
Synth FM Amount	Envelope Follower Amplitude
Synth Attack	Delay 1 D/W
Synth Release	Stereo Pan 2 D/W
Ensemble Amount	MMF 3 D/W
Vocoder Attack	Delay 1 Time
Vocoder Release	Stereo Pan 2 Rate
Vocoder Mix	MMF 3 Cutoff
Vocoder Balance	

For example, if you want Aftertouch to control the Osc 2 Level in the Assign section, assign Aftertouch as the Source, and Osc 2 Level as the destination.

8.4.3. Assigning Modulation Amount

All Sources specify the Amount by which they modulate the Destinations, which can vary from a subtle change to an obvious one. With the Envelope Follower and LFO, the Amount parameter is below each Destination. In the Assign section, the Amount is the column to the right.



With Amount = 1.00, the modulation source will control the full range of the Destination parameter, in a positive way (e.g., turning up the Mod Wheel increases the Destination parameter value). With Amount = -1.00, the modulation source will control the full range of the Destination parameter, in a negative way (e.g., turning up the Mod Wheel decreases the Destination parameter value). Amounts between these extremes trim the modulation Source's effect. For example, if you want the Mod Wheel to turn up a parameter value to only half of the available maximum, then set the Amount to 0.500.

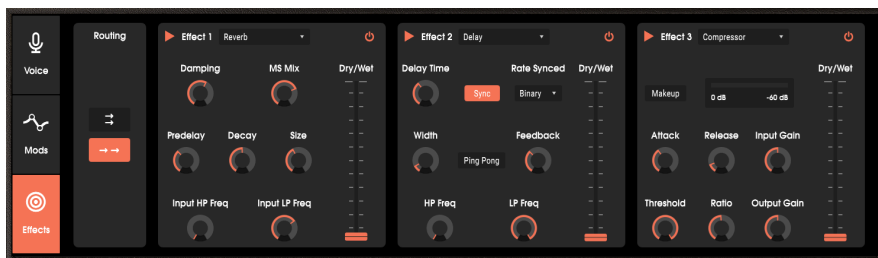
9. THE EFFECTS

9.1. About the Vocoder V Effects

The 11 high-quality effects that are part of Vocoder V extend its creative options. These effects include models of classic analog effects as well as modern digital effects. Because these effects are incorporated in Vocoder V, in stand-alone mode it's not necessary to use a plug-in host (e.g., MainStage) to load both Vocoder V and other plug-ins. With DAWs, a Vocoder V preset can include effects that would normally require inserting other plug-ins. This makes Vocoder V a self-contained plug-in that will likely include most, if not all, of the effects you would want to use. The roster of effects includes:

- **Reverb** Emulates the effect of playing in an acoustic space, from a small room to large hall.
- **Delay** Repeats the input signal with adjustable time, feedback, tone, stereo width, ping-pong, and sync options
- **Chorus** Classic, sweet modulation effect that multiplies the sound of one instrument into sounding like several instruments are playing together.
- **Flanger** A swooshing, pitch effect with a metallic sound, that offers multiple tonal adjustments and sync option.
- **Phaser** A sweeping, swirling effect first made popular in the late 60s.
- **Overdrive** Adds a solid-state, oversaturated distortion character. A tone control provides different sonic possibilities.
- **Compressor** A common dynamics processor to control peaks and give a full sound.
- **BitCrusher** Bit depth reduction with a range of 16-bit to 1.50 bits, with wide sample rate reduction options.
- **Multi Filter** Synthesizer-type filter with multiple filter topologies and slopes, some with resonance.
- **Param EQ** 5-band fully parametric EQ with three fully parametric stages, and low and high shelving stages with resonance.
- **Stereo Pan** Moves the sound between the left and right channels with definable depth, rate, and sync options.

9.2. The Effects Panel

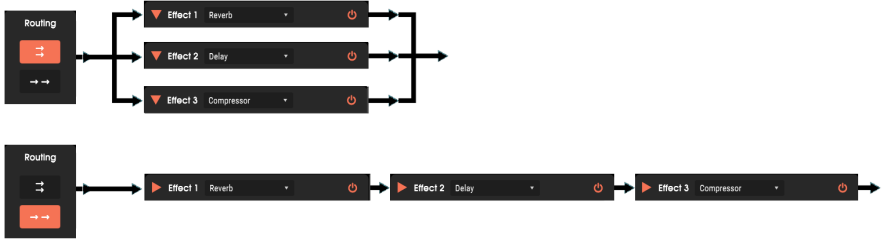


Click on the Advanced button in the upper toolbar to open the Advanced panel, then click on the Effects button to open the Effects section with its three effects slots. All three effects are available simultaneously.

9.3. Parallel and Serial Effects Routing



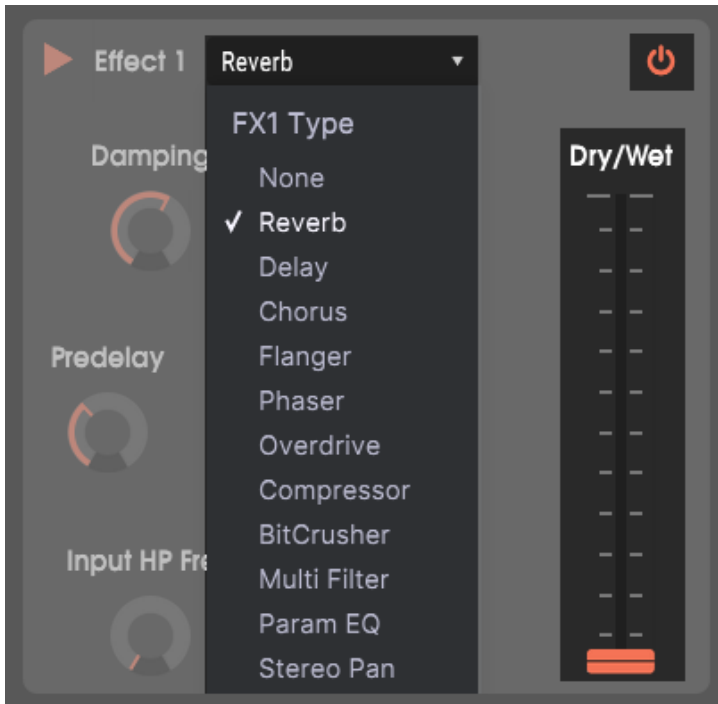
Routing chooses whether the effects are in parallel (top routing button) or in series (bottom routing button). The arrows in each slot's upper left point to the right for a series connection, or down for a parallel connection.



The upper image shows the parallel connection routing. Vocoder V feeds the inputs of all three effects slots, and all three outputs are mixed together.

The lower image shows the series connection routing. Vocoder V feeds the input of the first slot. The first slot's output feeds the second slot's input, the second slot's output feeds the third slot's input, and the third slot's output provides Vocoder V's final output.

9.4. Common Slot Controls



Each Slot has three common controls.

- **Effects Selector** Clicking on the effect name opens a drop-down menu that lists all the available effects. Click on an effect to choose it for the slot.
- **Effect On/Off** The power button in the slot's upper right enables or bypass the effect.
- **Dry/Wet Slider** The Dry/Wet slider toward the slot's right controls the percentage of the input signal that passes through to the output without processing. With the slider all the way up, the slot output is entirely processed sound. Moving the slider down changes increases the percentage of the input sound until when the slider is all the way down, the effect is the same as if it was bypassed.



Tip: All effect parameters are MIDI-assignable, so the MIDI "learn" function (see section 10 on MIDI Control) can map effect parameters to the hardware controls on an external USB MIDI controller.

9.5. Each Effect in Depth

The section on each effect starts with a brief description of the effect's intended application and some other background, followed by descriptions of each effect's unique controls and indicators.

9.5.1. Reverb

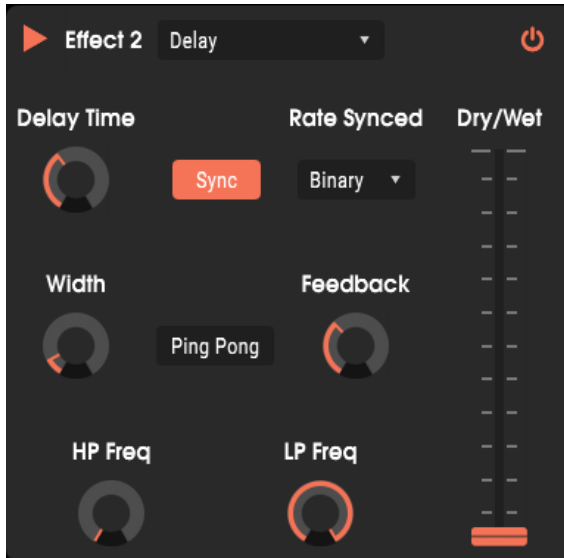


This effect emulates the myriad echoes that sound creates as it bounces among surfaces in an acoustic space (like a room or concert hall), until the echoes eventually fade out. Each control has a significant effect on the sound.

- **Damping** Different frequencies decay at different rates as the echoes bounce around in an acoustic space. High frequencies decay faster in rooms with soft, sound-absorbing surfaces (more damping), and more slowly in rooms with hard surfaces (less damping). Low damping settings give a brighter reverb sound as the echoes decay, while high damping settings create a darker reverb sound as the decay progresses.
- **MS Mix** This knob controls the reverb's stereo image. Low settings sound monophonic because all the sound is in the center of the stereo field, while high settings expand the sound outward toward the right and left sides, for a wider stereo image.
- **Predelay** In an acoustic space, a certain amount of time elapses before the sound starts hitting surfaces and creates reflections. This time before the reverb begins is called predelay. Increasing predelay can create the sense of a larger space. Predelay is also used to prevent reverb from interfering with the attack of percussive audio, like drums.
- **Decay** Sets the time for the reverberant echoes to fade to silence.
- **Size** Controls the size of the reverberant space. Low settings sound like smaller rooms, while higher settings sound like massive halls and chambers. Use this knob in conjunction with the Predelay and Decay controls to sculpt a variety of different sonic spaces.

- **Input LP Freq** This sets the cutoff frequency for a low pass filter that processes the input signal prior to passing through the reverberation. An excessively bright input can make the reverb sound brittle, harsh, or unnatural, so reducing high frequencies can often give a “sweeter” reverb tone.
- **Input HP Freq** This sets the cutoff of a high pass filter that processes the input signal prior to passing through the reverberation. Adding reverb to low frequencies can make the overall sound muddy, bass-heavy, and indistinct. Trimming the low frequencies often gives a clearer, more defined reverb effect.

9.5.2. Delay



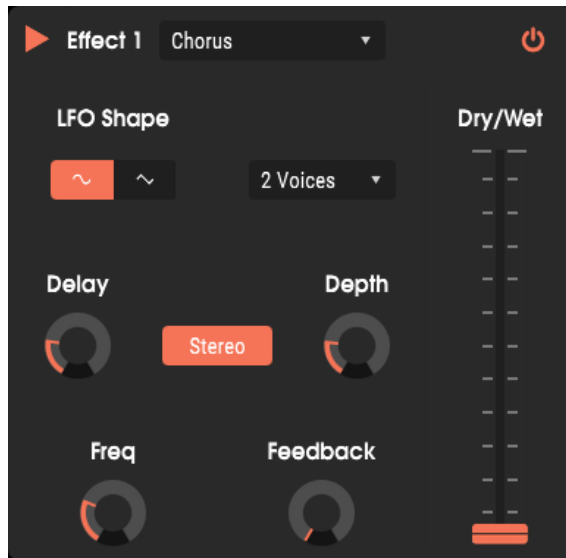
Delay can increase a sound's spaciousness by copying the sound at the input, and playing it back later at a reduced level—what's called an echo. Compared to reverb, this gives a more focused, less complex sense of space. Another application is setting delay to sync with a song's tempo, which can provide a rhythmic counterpoint that emphasizes a groove.

- **Delay Time** (2 to 2000 milliseconds). Sets the time between hearing the input signal and the first delay. Delay times can also be shown as rhythmic values (see Sync below).
- **Sync** Locks the delay to the current song tempo in a DAW, or in stand-alone mode, the Vocoder V's internal tempo (as set in Audio Midi Settings). With Sync enabled, a tooltip appears when adjusting the Delay Time that shows the delay as a rhythmic value. Deactivating Sync causes the tooltip to display the Delay Time in milliseconds.
- **Rate Synced** This is active only if Sync is enabled, and further defines the rhythmic value as Binary (standard rhythmic values), Ternary (triplets), or Dotted.
- **Width** Controls the delay's stereo image, from narrow at low settings, to a wide, expansive stereo image at higher settings.
- **Ping Pong** Enable this to pan alternating delays left and right, so that they "bounce" from one side to the other in the stereo field.
- **Feedback** Determines how much of the Delay's output is fed back into its inputs. Each time an echo is fed back, it recirculates through the Delay and creates another echo. Higher settings mean that the delays will continue to repeat successively until they eventually fade out.

Tip: Setting Feedback to maximum produces an infinite repeat of the delays, effectively turning the Delay into a Looper.

- **LP Freq** This sets the cutoff frequency for a low pass filter that processes the input signal prior to passing through the Delay. An excessively bright input can give delayed sounds a harsh quality, or interfere with other sounds happening at the same time by “masking” their high frequencies. Trimming the LP Freq minimizes both these problems.
- **HP Freq** This sets the cutoff of a high pass filter that processes the input signal prior to passing through the Delay. Excessive low frequencies can make the overall sound muddy, bass-heavy, and indistinct. Trimming the low frequencies can give a more defined delay sound.

9.5.3. Chorus

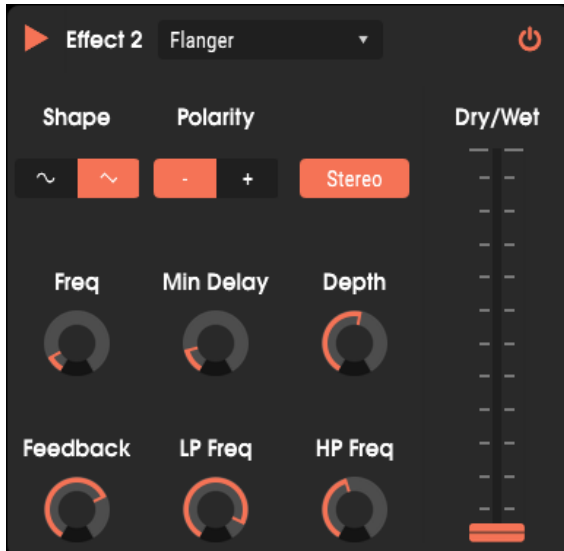


The Chorus gives a rich, full sound by emulating the result of combining multiple instrument takes in a mix, or several players playing the same instruments en ensemble. The basic effect works by duplicating the input signal, delaying the duplicate, and modulating its delay time slowly with an LFO. Mixing the dry and delayed signal (typically 50% dry and 50% delayed) produces interactions between the two signals that create the actual chorus effect. The Vocoder V chorus can create more than one copy of the input signal, for an even richer effect.

i 🎵: The chorus effect is similar to the Flanger effect (see below), except chorus delay times tend to be longer (0.6ms minimum for this effect). This results in a subtle, natural sound instead of a sound that's more like a special effect.

- **LFO Shape** Selects either a sine or triangle wave to modulate the delayed voices.
- **Voices** Chooses from one to three duplicated voices. More voices give a thicker, more diffused effect.
- **Delay** Sets the initial delay time for the chorus effect. Longer delays give a more diffused effect.
- **Stereo** Enable Stereo for a wider and more modern sound, or disable it for a mono, more vintage effect.
- **Depth** Sets the strength of the LFO's modulation on the delayed signal, from very subtle to quite extreme.
- **Freq** Adjusts the LFO rate to determine the chorus speed.
- **Feedback** Determines how much of the Chorus output is fed back into its own input. Higher settings give a more resonant effect.

9.5.4. Flanger

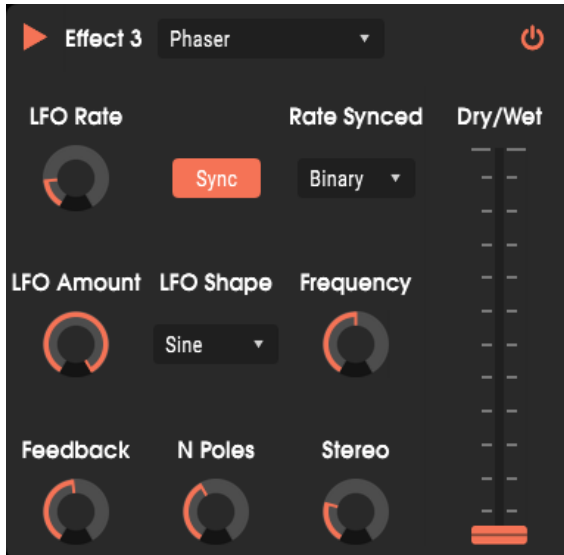


The Flanger effect is based on the same general principle to the Chorus effect above, except that the delay time tends to be much shorter (as low as 0.001 ms). The extremely short delay time produces a “comb filter” effect that sweeps up and down through the harmonics of the original signal.

Flanging can create effects from subtle to extreme, depending on the modulation Rate and Depth (as well as the Feedback and Polarity). Higher Depth settings produce audible pitch changes, like traditional analog flangers.

- **Shape** Selects either a sine or triangle wave to modulate the delayed sound.
- **Polarity** This determines whether the feedback polarity will be out of phase (negative, which gives a more “hollow” sound) or in-phase (positive, which imparts a sharper, more resonant sound). This parameter is also influenced by other parameter settings, so experiment with positive and negative settings to determine what works best for your track.
- **Stereo** Enable Stereo for a wider and more modern sound, or disable it for a mono, more vintage effect.
- **Freq** Sets the LFO rate, which modulates the minimum delay time (see next).
- **Min Delay** Sets a minimum limit for the delay time, which determines the frequency peak that flanging attains.
- **Depth** Sets the strength of the LFO’s modulation. This is limited to less than 100% to limit uncontrollable feedback.
- **Feedback** Determines how much of the flanger’s output is fed back into its own input. More feedback produces a sharper, more metallic timbre.
- **LP Freq** Sets the flanger’s lowpass cutoff frequency. Flanging isn’t applied to frequencies above the cutoff.
- **HP Freq** Sets the flanger’s highpass cutoff frequency. Flanging isn’t applied to frequencies below the cutoff.

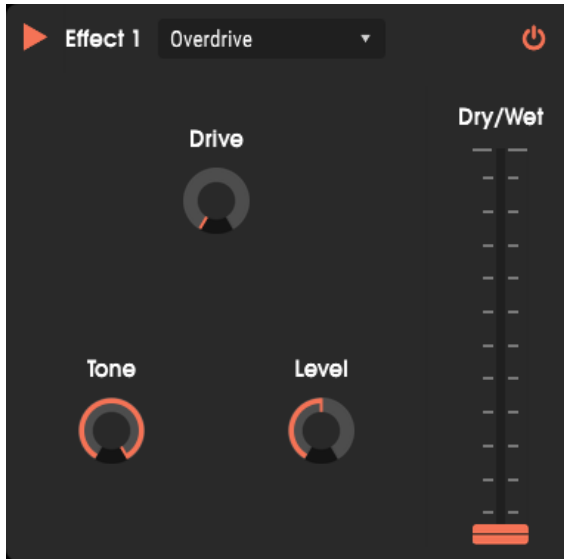
9.5.5. Phaser



Phase shifting, first popularized in the late 1960s, adds a swirling, animated character to the sound. It works by splitting the incoming signal, modulating the phase of one split, and recombining it with the dry signal. This creates one or more notch filters, whose notch sweeps through the frequency spectrum, causing the phase shifter's signature "whooshing" sound. This stereo phaser models analog phasers, but also includes tempo synchronization.

- **LFO Rate** Sets the LFO speed. Enabling tempo synchronization (see below) displays this parameter as a rhythmic value. Disabling synchronization displays the Rate parameter in Hz.
- **Sync** Locks the delay to the current song tempo in a DAW, or in stand-alone mode, the Vocoder V's internal tempo (as set in Audio Midi Settings). With Sync enabled, a tooltip appears when adjusting the Delay Time that shows the delay as a rhythmic value. Disabling sync cause the tooltip to display the Delay Time in milliseconds.
- **Rate Synced** This is active only if Sync is enabled, and further defines the rhythmic value as Binary (standard rhythmic values), Ternary (triplets), or Dotted.
- **LFO Amount** Sets the strength of the LFO's modulation, with more modulation sweeping the notch filters over a wider frequency range.
- **LFO Shape** Sets the wave shape of the modulating LFO. Choices are Sine, Triangle, Saw, Ramp, Square, and Sample and Hold (random).
- **Frequency** Sets the center frequency around which the phaser modulation affects the incoming signal.
- **Feedback** Controls the resonance of the Phaser's filters. Caution: Higher settings can make the filtering effect very pronounced.
- **N Poles** Sets the number of poles used in the sweeping filter. Lower settings sweep fewer notch filters for a subtler sound, while higher settings sweep more filter notches for a more dramatic effect.
- **Stereo** Sets the effect's stereo width, from mono to maximum stereo (i.e., the stereo image covers the range from all the way left to all the way right).

9.5.6. Overdrive



Overdrive adds enough gain to the input so that it runs out of headroom, which cause the input to clip and distort. This introduces harmonics that add a harsh edge to sounds, and is similar to an overdrive pedal for guitar.

- **Drive** Sets the overdrive amount.
- **Tone** Turning this clockwise raises the frequency of a high-frequency shelving filter to brighten the sound and adds a harsher edge.
- **Level** Sets the Overdrive's output level to compensate for any increase in output level caused by increasing Drive.


9.5.7. Compressor



A compressor narrows a signal's dynamic range to even out level variations. You can think of it as a very fast volume control that turns down the level when it's too loud, and raises the level back up when the signal level returns to normal. Although originally designed for broadcasting, audio engineers have found many creative uses for compressors beyond simply evening out loudness levels. For example, many mix engineers use compressors to bring an increased sense of power and excitement to a single track or an overall mix, guitarists use compression to increase sustain, and extreme settings cause "pumping" effects that are common on EDM recordings.

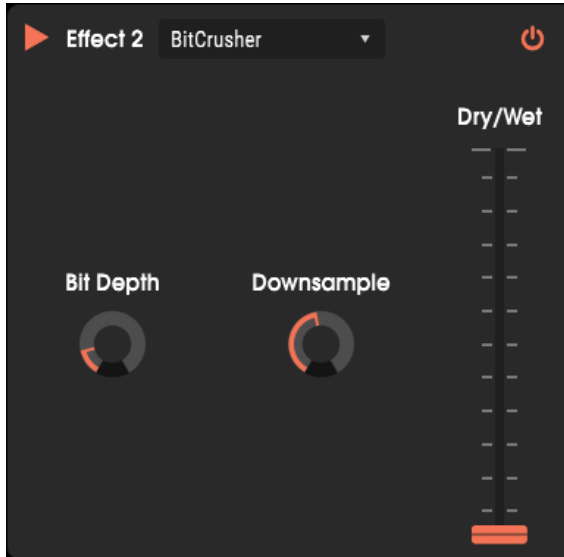
When used as part of an effects chain, a compressor can keep a sound's attack transients from overloading the next effect's input. It can also extend the duration of a sound's amplitude envelope that naturally decays quickly, thus creating a longer sustain. Drums are often compressed to bring up room sound and add "punch." Compression is also added to radio and television audio levels to keep them within a certain volume range.

- **Makeup** Switches the compressor's automatic make-up gain on and off. This feature compensates for the natural output level reduction that happens when the compressor brings down peaks.
- **Attack** Specifies the time it takes for the compression to react to an incoming signal. With short attack times, the compressor will start controlling level as soon as the input signal passes over the Threshold (described below). Longer attack times increase the amount of compression over the specified time until it reaches the maximum set amount of compression. This allows momentary peaks to pass through with little or no compression, which can preserve natural "attack" transients. Note that if you use compression with Vocoder V, adding some attack time will help preserve consonants at the beginnings of words, and create a more intelligible effect.

 Using the Dry/Wet slider to add some dry sound in with the compressed sound can also help preserve transients, while still giving a full, compressed sound. This technique is called parallel compression.

- **Release** Specifies the time it takes for the compression action to stop after the input signal returns below the threshold. Longer release times give a more natural sound, shorter release times can emphasize the percussive nature of instruments like drums, and extreme settings can create "pumping" and "breathing" artifacts. Go ahead and experiment—maybe you'll stumble on a sound you love!
- **Threshold** Sets the loudness level above which the compressor starts compressing, and below which the compressor stops compressing.
- **Input Gain** Adds gain to the signal at the compressor's input. This is important, because the compression action depends on when the input signal goes above or below the threshold. If the signal level is low, it won't go over the threshold much but if the signal level is high, it will be compressed constantly. Use input gain to adjust the input level for the best results with the compressor settings.
- **Ratio** Once the input level exceeds the threshold, the ratio determines how much the output level will increase for a given amount of input level increase. For example with a 2:1 ratio, input signal levels that exceed the threshold by 2 dB will increase by only 1 dB at the output. Or, an 8 dB increase above the threshold will result in only a 4 dB increase at the output.
- **Output Gain** Controls the compressor's final output level. If you do not select the Makeup option, you will probably need to adjust this manually to compensate for the lower output level caused by compression.

9.5.8. BitCrusher

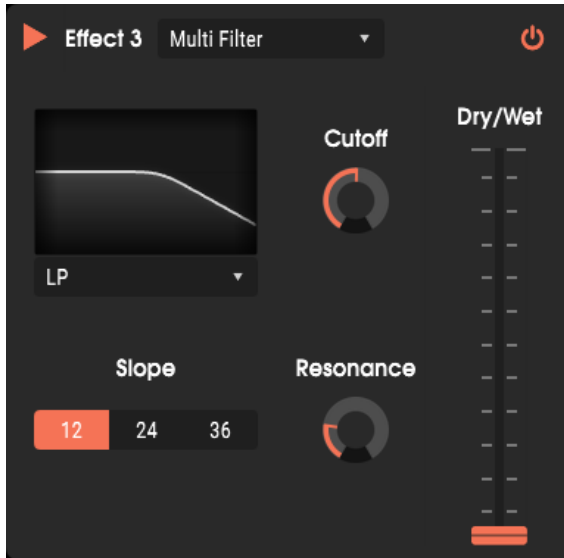


Arturia instruments make maximum use of digital technology to generate high-fidelity sounds. But sometimes you want to be nasty, and this technology can also be warped to create gritty, lo-fi, industrial sounds. The Bitcrusher adds digital distortion by intentionally reducing the bit depth and sampling rate of incoming signals. If you're nostalgic for the early days of digital with 4-bit audio resolution and an 11.025 kHz sample rate, this is the effect for you.

To explore the BitCrusher, start by setting the Bit Depth and Downsample dials to minimum. Then gradually turn up each dial to reduce the incoming signal's bit depth and lower its sampling rate. Each knob has a different degrading effect, so experiment with different settings to find the ideal amount of sonic destruction and devastation.

- **Bit Depth** Turn up this knob to reduce a sound's resolution (i.e., the number of bits used to render an output) from 16 bits to 1.5 bits.
- **Downsample** Resamples the already bit-reduced signal (set by the Bit Depth knob). As you turn up this knob, your incoming signal will be re-sampled at lower and lower frequencies, which increasingly destroys the sound's fidelity.

9.5.9. Multi Filter



Multi Filter is a powerful sound-shaping filter, with five distinct filter modes, for sculpting frequencies at the output stage. It's much like the filters found in synthesizers.

- **Filter Mode** Choose from five different filter modes: Low Pass, High Pass, Band Pass, Comb Feed Back, Comb Feed Forward.

i The LP, HP and BP filter modes display an additional parameter for changing the filter slope among -12, -24, or -36 dB/octave.

- **Cutoff** Controls the frequency above or below which the filtering action takes place.
- **Resonance** Controls the gain around the cutoff frequency for the LP, HP, and BP filters, which creates a peak at that frequency. Higher resonance settings create a sharper peak. For the Comb FB filter, Resonance increases the peak of the combs, while for the Comb FF filter, Resonance increases the depth of the comb's notches.

9.5.10. Param EQ



The parametric equalizer is a versatile way to adjust frequency response, because it can boost (make more prominent) or cut (make less prominent) specific ranges of the frequency spectrum. This kind of EQ is suitable for broad tone-shaping, or precise, surgical fixes. The Param EQ has five stages: Low Shelf, three fully parametric stages, and a High Shelf. Each has the same three associated controls.

A parametric stage boosts or cuts at a specific frequency, over a specific bandwidth (range of frequencies). A shelf response starts boosting or cutting at a selected frequency, but this boost or cut extends outward toward the extremes of the audio spectrum. Past a certain point, the response hits a flat "shelf" equal to the maximum amount of boost or cut. In the image above, each EQ stage is represented by a node. Going from left to right, here's what each node indicates:

- Low Shelf, cutting low frequencies
- Parametric stage 1, with a sharp, narrow boost
- Parametric stage 2, with a broader, gentler boost
- Parametric stage 3, with an extremely sharp and narrow cut
- High Shelf, boosting high frequencies

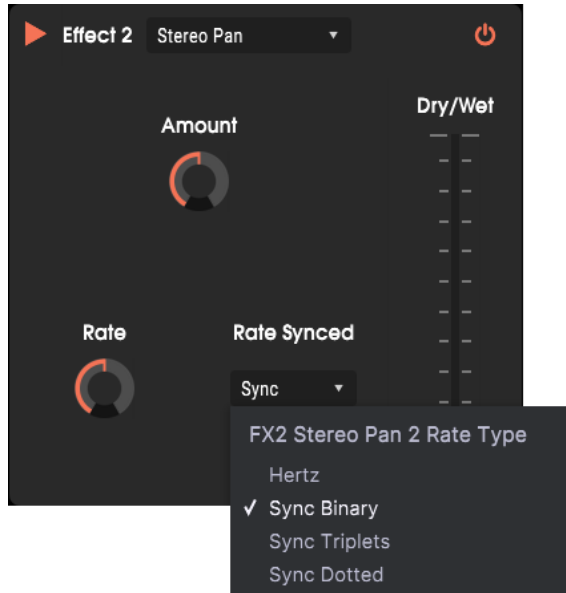
The controls produce somewhat different results with the shelf and parametric EQs.

- **Filter Selector** The five blocks (LS, 1, 2, 3, and HS) choose the desired filter for editing.
- **Frequency** For the three parametric stages, this sets the frequency at which boosting or cutting occurs. With the Low Shelf, this determines the cutoff frequency below which boosting or cutting occurs. With the High Shelf, this sets the cutoff frequency above which boosting or cutting occurs. You can use the Freq knob to choose the frequency, or click on a node and drag left or right.
- **Gain** This boosts or cuts the peak with the parametric stages, and boosts or cuts the shelf with the Low Shelf and High Shelf stages. You can use the Gain knob to boost or cut, or click on a node and drag up (boost) or down (cut).
- **Q** With the parametric stage, this determines the range over which a boost or cut occurs, from narrow to broad.



When cutting the Low Shelf stage or boosting the High Shelf stage, Q adds a cut before the cutoff frequency and a boost afterward. When boosting the Low Shelf stage or cutting the High Shelf stage, Q adds a boost before the cutoff frequency and a cut afterward. In the image above, Q is turned up for both the Low Shelf (left) and High Shelf (right) filters, which are cutting and boosting respectively.

9.5.11. Stereo Pan



Stereo pan sweeps the output smoothly between the left and right channels, and the sweep can be synchronized to the current song tempo in a DAW, or in stand-alone mode, the Vocoder V's internal tempo (as set in Audio Midi Settings).

- **Amount** Turning this up widens the sweep, so that at the maximum setting, the sound sweeps across the full stereo field. Lower settings sweep over a narrower range of the stereo field.
- **Rate** This works in conjunction with the Type field, whose drop-down menu offers four choices: Hertz (not synced), Binary (standard rhythmic values), Triplets, or Dotted. Rate specifies the frequency in Hertz, or the rhythm value specific by the sync type.

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